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ABSTRACT

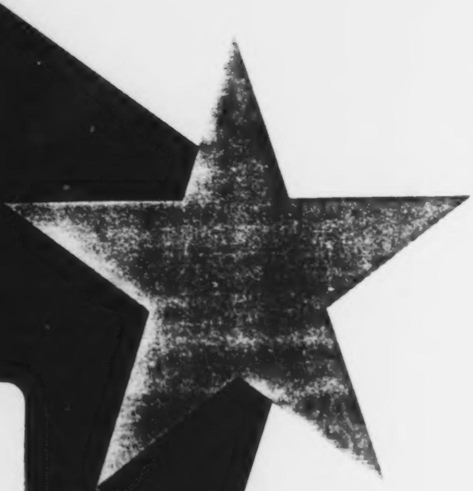
This publication contains detailed reports from the eight subcouncils established by the Competitiveness Policy Council to develop specific policy recommendations in eight areas. "Building a Standards-Based School System" (Education Subcouncil) recommends redirecting the education system toward achieving the National Education Goals, developing standards and new assessments, developing capacity of schools and youngsters to achieve high standards, and developing an incentive and accountability system. "Building High-Performance Workplaces" (Training Subcouncil) proposes a four-part economic strategy: build a training system that works, promote continual skills development, enhance school and work integration, and ease the adjustment process. "Technology Policy for a Competitive America" (Critical Technologies Subcouncil) recommends increasing national investment in civilian and dual-use research and development, promoting commercialization of strategic technology, creating a world-class technology base, and organizing organizations for results. "The Will to Act" (Subcouncil on Corporate Governance and Financial Markets) proposes improvements in the corporate governance process by corporation, shareholder monitoring in this process, and improved corporate performance evaluation. "A Trade Policy for a More Competitive America" (Trade Policy Subcouncil) recommends creation of an "export mentality," world growth strategies and exchange rate coordination, trade negotiations to open markets, export promotion, export disincentive reduction, and a streamlined trade bureaucracy. "Forging the Future: Policy for American Manufacturing" (Manufacturing Subcouncil) recommends leadership for manufacturing excellence, investment in manufacturing assets, and effective use of manufacturing assets. "Investing in Our Future" (Public Infrastructure Subcouncil) focuses on needs for action in the areas of efficient transportation, adequate financing, and advancement of new telecommunications technologies. "Saving, Investment, and the Budget" (Capital Formation Subcommittee) recommends two ways to increase national savings: raising private savings and reducing public spending. (YLB)

ED356390

REPORTS OF THE SUBCOUNCILS

COMPETITIVENESS POLICY COUNCIL

Education
Training
Critical Technologies
Corporate Governance and Financial Markets
Trade Policy
Manufacturing
Public Infrastructure
Capital Formation



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March 1993

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Competitiveness Policy Council

The Competitiveness Policy Council was established by Congress in the Omnibus Trade and Competitiveness Act of 1988. It is an independent federal advisory committee reporting to both the President and Congress.

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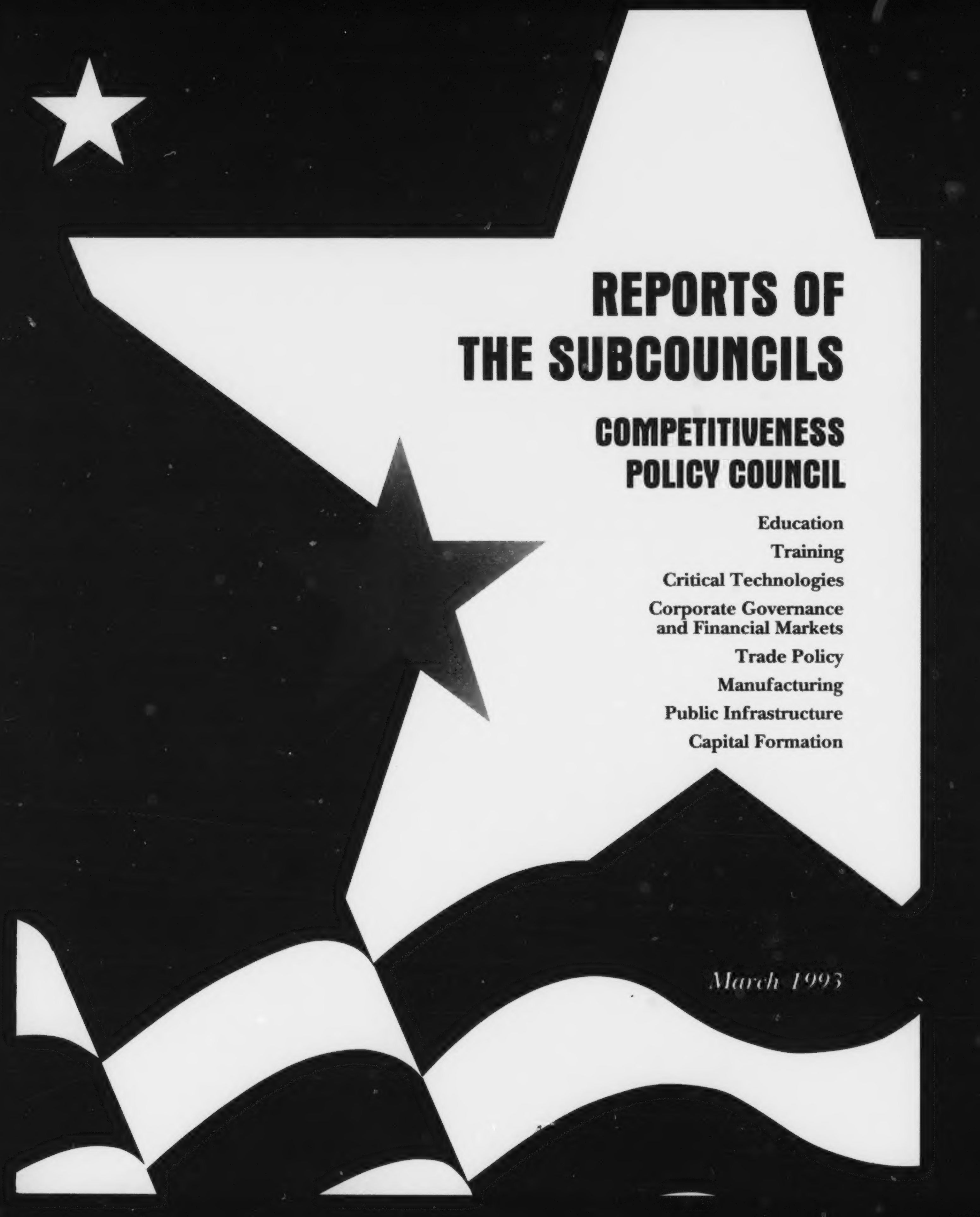

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Education
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Capital Formation

March 1993

COMPETITIVENESS POLICY COUNCIL

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March 15, 1993

Honorable William J. Clinton
President of the United States
The White House
Washington, DC 20500

Dear Mr. President:

The Competitiveness Policy Council is pleased to deliver the detailed reports from our Subcouncils as part of our Second Report to the President and Congress.

These reports represent the work of the eight Subcouncils which we announced in our first Report in March 1992. In addition to drawing heavily from these efforts in preparing our recommendations to the President and Congress, the Council has decided to publish the Subcouncil reports as separate documents. Although the Council takes no formal position on these reports, we believe that the richness of their analysis and insight, and the detailed proposals, should be available to the widest possible audience.

The success of our Subcouncils was made possible by the extraordinary contribution of time by over 200 leading Americans who agreed to participate. Each Subcouncil reflected the quadripartite composition of the full Council — business, labor, government (federal and state) and the public interest — and included members from across the country. The Council wishes to thank all of those who participated in, or made presentations to, our Subcouncils.

The eight Subcouncils and their Chairmen were:

Peter G. Peterson	Capital Formation
Edward V. Regan	Corporate Governance
Erich Bloch	Critical Technology
Albert Shanker	Education
Ruben F. Mettler	Manufacturing
Gerald L. Baliles	Public Infrastructure
John J. Murphy	Trade Policy
Lynn R. Williams	Training

By releasing these reports simultaneously with the report of the full Council, we hope to stimulate and to better inform the ongoing national debate about ways to improve American competitiveness.

Sincerely,

C. Fred Bergsten
Chairman

Enclosure

Note: Identical letters were sent to Albert Gore Jr., President of the Senate, and Thomas S. Foley, Speaker of the House of Representatives.

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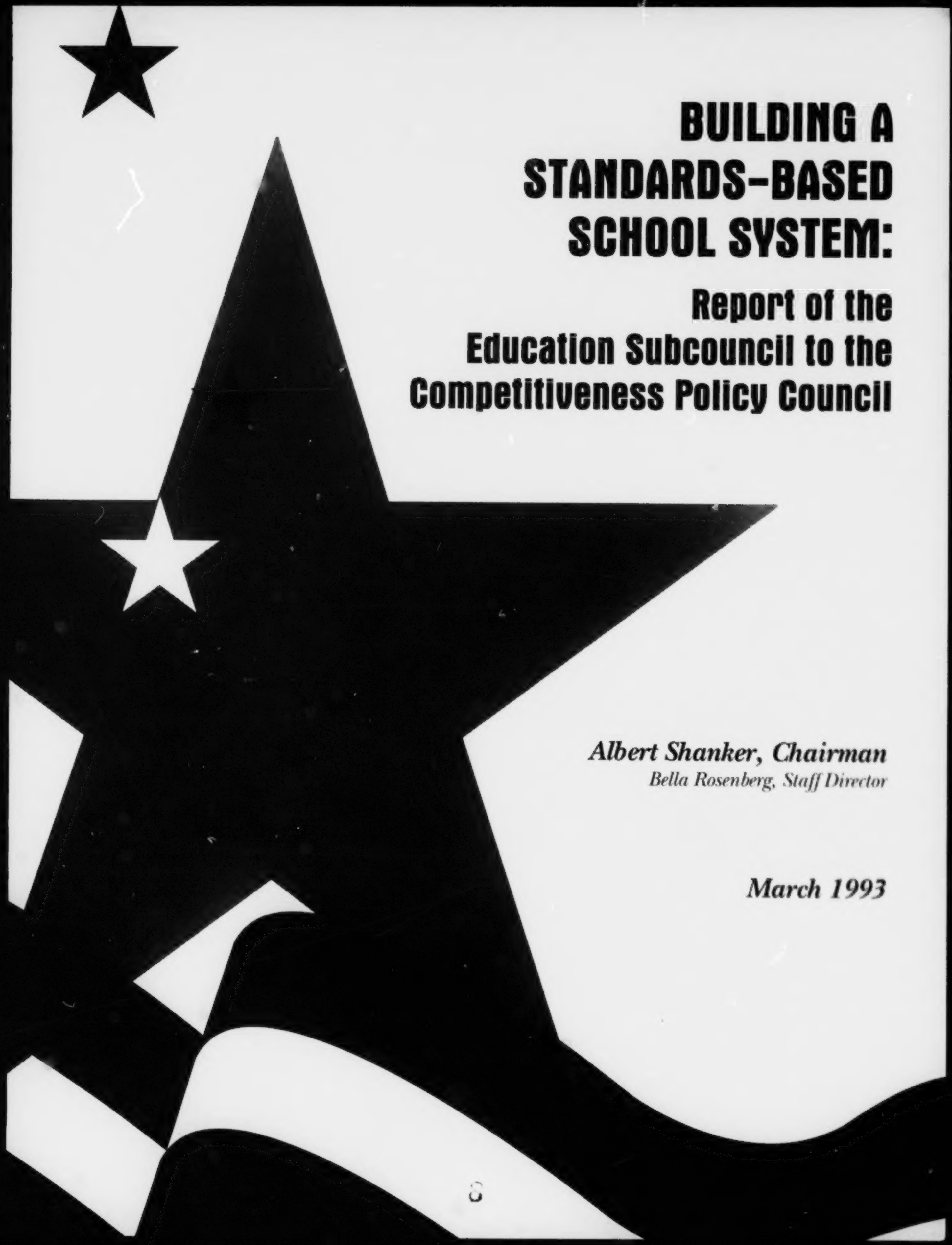

BUILDING A STANDARDS-BASED SCHOOL SYSTEM:

Report of the Education Subcouncil to the Competitiveness Policy Council

Albert Shanker, Chairman

Bella Rosenberg, Staff Director

March 1993

Education Subcouncil

Chairman
Albert Shanker
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Paul E. Barton
Director, Policy Information Center, Educational Testing Service

John Bishop
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Senior Fellow, Manhattan Institute

Constance Clayton
Superintendent of Schools, Philadelphia School District

Chester E. Finn, Jr.
Professor of Education and Public Policy (on leave), Vanderbilt University, and Founding Partner, The Edison Project

William D. Ford
US House of Representatives

Keith Geiger
President, National Education Association

Joseph T. Gorman
Chairman, President and CEO, TRW Inc.

Steven Gunderson
US House of Representatives

Sylvia Ann Hewlett
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Joe A. Howell
President, Central Methodist College

Ira Magaziner
President, SJS, Inc.

Lydia Marshall
Senior Vice President, Marketing Division, Student Loan Marketing Association

Richard P. Mills
Commissioner, Department of Education, State of Vermont

Diane Ravitch
Assistant Secretary for Education Research and Improvement, US Department of Education

Isabel V. Sawhill
Senior Fellow, The Urban Institute and Columbia University

Kurt Schmoke
Mayor, City of Baltimore, Maryland

Dorothy Shields
Director, Department of Education, AFL-CIO

Paul Simon
US Senate

Marshall S. Smith
Dean, School of Education, Stanford University

Harold W. Stevenson
Center for Human Growth & Development, University of Michigan

Susan Traiman
Program Director, Education Program, National Governors' Association

Harrison B. Wilson
President, Norfolk State University

Alan L. Wurtzel
Chairman, Circuit City Stores, Inc.

COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

C. Fred Bergsten
Chairman, Competitiveness Policy Council
11 Dupont Circle
Washington, DC 20036

Dear Fred:

The members of the Education Subcouncil are pleased to submit our report and recommendations for substantially improving the performance of American schools and students. As we note in our report, this nation's poor achievement in education is not the sole cause of our economic competitiveness problems. But without a highly educated citizenry and workforce, we can expect little return from other competitiveness strategies we may pursue. Everyone likes to say that improving education must be a national priority. In fact, doing so is essential.

The ambitious task we set for ourselves could not have been accomplished without the extensive expertise, experience and seriousness of purpose the twenty-five members of the Subcouncil brought to the table. By the criterion of quantity of reading alone, this group deserves special recognition. Additional thanks to Paul Barton, John Bishop, Isabel Sawhill, Marshall Smith and Harold Stevenson for their extra work in educating us on the issues. My appreciation also to Bella Rosenberg, who as our staff-less staff director did yeoman work managing our activities and drafting our report; to Marcia Reecer for her help with the report; to CPC Executive Director Howard Rosen for his patience, skill and interest in our issues; and to Richard Levy of the CPC staff for his assistance.

It is noteworthy that this report reflects the broad consensus of our diverse and knowledgeable group about the direction and elements of education reform, even though individual Subcouncil members may not subscribe to every provision. Our Subcouncil was particularly impressed, and troubled, by how unsystematic and directionless our education system is and by how basic issues of teaching and learning have been neglected in this nation. We believe the key to turning this around consists of the following strategy: Adopt clear and high standards for what students should know and be able to do as a result of their schooling; develop the capacity of schools to teach to high standards and the capacity of youngsters to achieve results. We urge the full Competitiveness Policy Council to adopt this strategy as its own and act on our basic recommendations.

Sincerely,

Albert Shanker
Chairman, Education Subcouncil

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I. Introduction and Executive Summary

If medical policy and practice had worked like elementary and secondary education policy and practice this past generation, chances are good we all would be dead by now. The victim of multiple diagnoses and conflicting treatments or miracle cures and lacking the means for self-help or even a standard of health, it is a wonder that the American education system has done as well as it has. It is also little wonder that this system is seriously ailing, demoralized and defensive. Enabling this nation's schools and students to function at the levels necessary to further America's pursuit of its democratic ideals and economic aspirations must be a national priority.

To be sure, our poor educational performance is not the sole cause of America's competitiveness problems. Nor will dramatically improving that performance be sufficient to overcome these problems. But none of the competitiveness strategies we may pursue — at least none aimed at improving both national and individual prosperity — can be effective without an enlightened citizenry and a workforce that is capable of continuous learning.

This report is framed by a number of perspectives reached after extensive review and discussion of the evidence. The first is that while the performance of our education system is in some respects better than it used to be, it is not as good as the performance of our competitors' education systems or nearly as good as it must be.[1] In the past, it was good enough to educate a small percentage of our student population to high levels. Today, we must accomplish this with everyone and under less favorable family and social conditions. Not only are we failing to meet the challenge, but Americans have barely acknowledged it.

We also have concluded that the poor performance of our schools and students is not only an urban or rural issue, it is a national problem. There is no question that achievement levels in disadvantaged school districts represent an especially acute disaster and that overcoming it will require particularly concentrated effort and strategies that go beyond the schoolhouse door. But even our advantaged school districts are achieving poorly relative to international standards. This has been a hard lesson for most Americans to learn, given the impressive college admissions rates for students in these districts. But America's world record in the proportion of students it sends to college is less a product of high student achievement than of low standards. Many colleges will admit anyone, so long as he or she can afford to go.[2]

The third perspective that frames our report is that there are no shortcuts to turning around our poor educational performance. The reforms we need are system wide. Put another way, we cannot solve our problems merely by "fixing" curriculum or graduation requirements or teacher licensing or school governance or by adding or subtracting this-or-that-policy or program. We have a longstanding habit of "fixing" one part or another of our education system while ignoring its relationship to and effects on the rest, and we almost invariably have been disappointed with the results. Indeed, the major result of this habit is that none of the parts now work together; we can hardly be said to have a system of education at all.

Our belief that this nation must pursue a system-wide reform strategy in education is not to say that what

America's 100,000 diverse elementary and secondary schools need is a command-and-control structure. In fact, our schools are already commanded and controlled by so many governmental and non-governmental masters, each pursuing its own agenda, that their attention is often focused more on bureaucratic compliance than on teaching and learning. Not surprisingly, the net result of so many directions is that our schools lack a direction. The purpose, then, of our recommendations for system-wide reform is not to stimulate another round of telling schools what to do, when and how. It is instead to set out a strategy for giving schools a common direction, based on high standards for what we want students to know and be able to do as a result of their education, enabling them to figure out how to get there given their particular circumstances and providing the supports and incentives they and their students need to do so.

Summary of Recommendations

▶ **Develop a coherent system of education by focusing federal, state and local education and education-related governance structures and policies on achieving the National Education Goals.**

▶ **Develop high-level content and performance standards (curriculum frameworks) for what students should know and be able to do in order to be prepared for democratic citizenship, higher education and productive employment in an advanced, continually changing economy.**

While nationally- or state-developed standards should not specify the precise curricula to be taught in schools, they should go well beyond vague student outcome statements and provide schools with guidance about the core ideas, topics and skills to teach students. States, districts and schools should ensure that the textbooks and other instructional materials they purchase or prepare are consistent with the new standards.

▶ **Develop new assessments that are based on the new standards and phase out standardized or minimum competency tests that are incongruent with these new standards.**

▶ **Develop the capacity of schools to help their students meet high standards by ensuring that they have the flexibility, expertise and resources they need to do so.**

Flexibility means substantial deregulation of schools by all levels of government. Improving the schools' expertise requires substantial restructuring of teacher education and licensing requirements, in-service staff development and salary incentives for continuing education to promote teachers' acquisition of the knowledge and skills needed to teach to new standards. Addressing the resources issue means providing schools with high concentrations of poor and special-needs youngsters their fair share of funding and making sure that those dollars are directly devoted to instructional purposes.

▶ **Develop a school-to-work transition system.**

We are skeptical that a single approach can accommodate the diverse circumstances of our schools, students and employers. We therefore recommend that decisions to expand existing programs and develop new ones be guided by a common set of principles. These principles include:

(1) Programs should be jointly designed by school systems and employers (and with unions, where applicable), spurred by or in direct partnership with government.
(2) Whether initially exercised or not, the postsecondary school option should be kept open for youth who intend to go directly from high school to work.
(3) Programs should integrate academic and vocational learning and school- and work-based experiences.
(4) Students' effort and performance in school should be linked with good jobs.

- **Develop the capacity of youngsters, particularly poor children, to meet new standards by overcoming the out-of-school barriers to learning and strengthening the family.**

- **Develop an incentive and accountability system that uses the results of assessments administered on a sampling basis to signal the need for external intervention in school systems and schools that fail to make progress in getting their students to achieve high standards.**

School systems and schools that fail to benefit from additional help should be subject to accountability measures such as transferring or removing officials and staff, reorganizing or even closing schools (and reopening them with new staff and programs), while those that achieve should be rewarded.

- **Phase in a student incentive and accountability system that is based in part on individual assessment results at the secondary school level.**

Motivating students to achieve will depend in great part on their seeing a payoff from performance, and that will require motivating colleges to reward students' efforts and achievement in high school in their admissions decisions and employers to do the same in their hiring decisions.

Education is a state responsibility that is locally administered and for which the federal government has historically had a limited but important role. Our recommendations therefore touch on all three levels of government whose laws and policies affect education. However, we have resisted the temptation to develop numerous programmatic solutions to the problems we identify. One reason is that we believe the last thing our 100,000 diverse elementary and secondary schools need is another one-size-fits-all set of reforms. The circumstances of individual schools and the students they teach, even within the same district, are very different across America, and it is time that distant report writers and government officials and bureaucrats stopped acting as if these differences did not exist.

To be sure, our report turns a great deal on putting in place a common core of high standards for students and on reorienting all the parts of the education system and related institutions toward supporting student achievement. That kind of standardization is essential both for promoting excellence and equal opportunity in our education system. Beyond that, we believe that federal, state and local education policies and programs must be flexible enough to give professionals at the school level the latitude to determine which means for reaching public goals are most appropriate for their students.

We were also reluctant to be prescriptive because, contrary to recent rhetoric, there is little certainty about what will work to turn our schools around. Unquestionably, there is more known about effective practices than is practiced in our schools (largely because this knowledge does not seem to get to the people who work in schools, either in their professional preparation programs or on the job). But that is vastly different from claiming that the precise cures to our problems are known and we need only get people to administer them.

For example, we have had a mass education system for more than a century, but we only have experience with educating the few to the high levels of accomplishment now necessary for the many. How do we do that, given that different children learn in different ways and at different rates? Similarly, we have never needed — or believed we needed — a school-to-work transition system. We urgently need one now, so it is tempting to import the practices of other countries that have long experience with such systems. Yet knowing what works in nations whose values and conditions are different from our own and whose schools and employers, unlike ours, have a tradition of formal relations and reciprocal responsibilities is not the same thing as knowing what will work here.

Or, to take another example, we know that incentives help shape human behavior and that there are precious few incentives for educators to approach their work differently or for students to work hard in school. Yet we do not know precisely which incentives will work in education and for whom. And we have learned, especially from the experience of business, that it is difficult to devise incentives that do not incur perverse consequences and that even incentives that work well today may lose their power tomorrow.

We have therefore offered a framework or strategy for overcoming America's educational competitiveness problem, while leaving specific tactics to the levels of government and institutions — especially schools — that should think about, devise and continually monitor and improve them. (This engagement by itself, we note, would be a major improvement over the bureaucratic compliance that now afflicts our education system.) The strategy we have recommended is straightforward: Adopt clear and high standards for what students should know and be able to do; develop the capacity of schools to teach to high standards and the capacity of youngsters to achieve them; and hold the school system and students accountable for the results.

Some people may think this is obvious, that it is how things already work. They are mistaken. Our expectations for students are opaque, and, to the extent that they are discernible, the prevailing standard is minimum competency. Our schools are consistently made to handle new challenges, but rarely do we examine their capacity to handle them, let alone prepare and help them to meet those challenges. Our childhood poverty level, incidence of family breakdown and teenage pregnancy and even our students' television viewing habits are among the worst in the industrialized world, but our efforts to overcome these and other conditions that depress youngsters' capacity to benefit from education have been lackluster. (We also observe, and disapprovingly, that there is a greater appetite for dumping family-type responsibilities on schools than there is for strengthening families.)

As for accountability practices, for students that generally means facing consequences on the basis of external, norm-referenced, standardized tests that are divorced from curriculum, so they cannot study for them, or being allowed to graduate from high school on the basis of passing a minimum competency test that rarely assesses content knowledge and is pitched to about 6th to 8th-grade level skills. These tests are also the basis of school accountability; not surprisingly, in many schools these tests now *are* the curriculum. But when average results are low, external authorities are rarely interested in why. And instead of getting help or sanctions, most floundering school districts or schools get more paperwork requirements.

In the parlance of standardized tests, none of the above makes sense to us. The system-wide reform strategy we are recommending may therefore be obvious, but it represents a great departure from current practice. For at its heart, it seeks to develop a coherent and high-quality system of education where no such system exists.

America's educational problems are severe but not intractable. We have faced severe challenges in education before. When America realized it needed a mass education system, it built one, and in relatively short order. For most of this century, Americans were the most highly educated people in the world. By now, however, most of the advanced industrialized societies with which we compete also have mass education systems, but with a difference: Higher proportions of their students — whether at the bottom, middle and top tiers of achievement — perform well relative to our students. A mass education system need not be a mediocre one. Making ours first class is the task before this nation.

II. Recommendations

Recommendation #1

Redirect the education system toward achieving the National Education Goals and becoming a standards-driven system.

Most American educators who have hosted foreign educators will attest to the difficulty their guests have in following their explanations of how the American K-12 education system works. They also would attest to their guests' looks of incredulity when they do grasp how our system works. It turns out our foreign visitors are onto something. The strengths of our decentralized system of education are also its weaknesses.

Education in America is a state responsibility that is locally controlled by lay school boards and federally influenced through a variety of largely categorical programs. That much many citizens could recite. But elementary and secondary education is also heavily influenced by private testing, curriculum and textbook publishing companies; courts; advocacy groups; parent groups; unions; foundations; consultants...*ad* almost *infinitum*. Lots of horses all pulling in the same direction (with time out for healthy conflicts about the best route to pursue) sounds like a well-functioning team. Unfortunately, most of our horses set their own courses, rarely pull together, charge all at once at our schools with different directions — and leave behind a considerable mess.

Since few accounts of the nature and effects of these systemic barriers to educational improvement in America are more astute than the one by Marshall S. Smith and Jennifer O'Day, it is worth taking a close look at what they have to say.

Smith and O'Day do not find the usual explanations for the poor performance of our education system convincing. The culprit, they say, is the "fragmented, complex, multi-layered educational policy system in which [schools]...are embedded."[3]

According to a popular myth about American education, local school boards run community schools in accordance with the wishes of the community. The reality is very different. Mandates, directives and guidelines come at schools from all levels of government — from federal congressional committees, federal departments and agencies and federal courts; from state legislative committees, boards, commissions and courts; from regional and county offices. The local school board and school district administrators, building administrators, teachers and parent committees are just a part of the picture:

> "Every level and many different agencies within levels attempt to influence the curriculum and curricular materials, teacher in-service and pre-service professional development, assessment, student policies such as attendance and promotion, and the special services that schools provide to handicapped, limited English-proficient and low-achieving students."[4]

Smith and O'Day do not argue that these various levels of government have no right to concern themselves with public education or that structure and regulations are inherently harmful. "Properly developed and organized, a consistent set of guidelines could create a nurturing structure within which schools could legitimately be held accountable for providing effective education to all students."[5] The

National Education Goals

1. All children in America will start school ready to learn.
2. The high school graduation rate will increase to at least 90 percent.
3. American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy. [Note: The arts, health and foreign languages have been added to the list of subjects.]
4. US students will be first in the world in science and mathematics achievement.
5. Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.
6. Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

problem with the present system is that there is no agreement about what things are important so there can be no strategy for achieving them and no coordination among the responsible levels and actors.

In addition to the various — and often conflicting — policy mandates that rain down on the schools, political pressures lead to what Smith and O'Day call a "project mentality." New administrators and politicians up for re-election are likely to propose quick fixes for what they believe ails their schools. These projects may look good — and there may be nothing wrong with them in principle — but they drain energy and resources and add to the snarl of programs and priorities in the schools. And of course local people are not the only ones in love with projects: Federal and state legislatures, universities and corporations also get into the act with projects that may be well-intended but are often short-sighted and short-lived.

In the meantime, while this or that policy is being mandated and this or that project is being proposed and carried out, the basic problems that face our schools are being ignored. Indeed, the uncoordinated energy that characterizes the way our schools are run virtually ensures that big problems will be overlooked:

> "Many of these problems have been the target of periodic reform measures, including those passed in the last decade. Although generally identified as problems of quality or quantity in resources, these deficiencies ultimately must be attributed to the lack of a coherent strategy for allocating the resources we do have or for overcoming problems in both quality and quantity when they arise."[6]

We strongly concur with Smith and O'Day's conclusion: The "fragmented authority structures and multiple short-term and often conflicting goals and policies have created dual conditions within the present education system: mediocrity in resources and conservatism in instructional practice."[7] Rationalizing this non-system must be a major component of our educational improvement strategy.

Principles to Guide Implementation

We do not mean rationalization in a bureaucratic sense, as yet another set of process-oriented directions, this time intended to undo previous directives. It does not mean getting all our schools to march in lock step or greater federal control of education. Rather, rationalizing our highly decentralized system of education means disciplining it by refocusing on the mission of public education in a democracy, reaching agreement on a common set of educational goals and standards and giving schools the capacity for self-improvement and continual renewal on behalf of the common mission and goals. We believe that a framework for doing this already exists in the form of the six National Education Goals adopted by the President and the nation's governors in 1989.

Although redirecting the constituent parts of the schooling system to pursue the National Education Goals is not sufficient to improve achievement, it is a necessary first step. For one, the crux of the National Education Goals is student achievement outcomes. (The goals also speak to some of the conditions necessary for improving student achievement, most notably, in Goal One, insisting that all children start school ready to learn. We will have more to say about Goal One later.) Without a shared understanding of what we want schools to accomplish with students, it is pointless to undertake yet another education reform movement; it will not work. Second, unless we know what our goals are, we cannot have an intelligent discussion about the means for attaining them or bring about any discipline or coherence to our education system. Once again, any direction will be as good as any other, with power and influence the main criteria for which policies, programs and regulations make it into the schools.

Acceptance of the National Education Goals, a bipartisan creation, is relatively high. To shift that acceptance from rhetoric to policy, we recommend that the following first steps be taken by the various levels of government responsible for schooling.

Federal

▶ Congress should formally adopt the National Education Goals and direct the US Department of Education and other departments and agencies whose work relates to the goals (e.g., Health and Human Services, Department of Labor, National Science Foundation, etc.) to use them in their program and budget planning and to coordinate their activities and regulations.

▶ Congress should formally authorize the National Education Goals Panel that was created by the President and the nation's governors to measure and report on progress toward achieving the goals.

▶ Congress should use the National Education Goals as a framework for reauthorizing its major education and related programs, such as the Elementary and Secondary Education Act and Head Start.

▶ Congress should make the main priority of the teacher education components of the Higher Education Act the promotion of teachers' acquisition of the high-level content knowledge and pedagogical skills necessary to help students meet the achievement goals.

▶ Congress should continue to support the National Board for Professional Teaching Standards' (NBPTS) research and development of standards and performance assessments for exemplary experienced teachers.

States

▶ The states should formally adopt the National Education Goals and direct their education departments and other agencies whose work relates to these goals to use them in their program and budget planning and to coordinate their activities and regulations.

▶ The states should adopt clear and high standards for what students should know and be able to do (see principles for developing standards in next section) and use them as the basis for restructuring and coordinating curriculum and testing programs, textbook adoption methods, regulations, teacher licensure requirements, in-service staff development programs and accountability systems. Using current student outcome data as a start, the states should identify those districts that have the greatest distance to go in achieving the National Education Goals and ensure that they have the resources and help they need for their students to compete.

- The states should review the NBPTS standards and certification assessments as they come on line and consider developing incentives for teachers to seek Board-certification. States should ensure that teachers in urban and rural districts, in particular, are targeted by the incentives they may offer.
- The states should use every available means to communicate to the public the meaning of the shift from expectations of minimum competency to expectations of high performance.

Local Governments

- Local governments should formally adopt the National Education Goals and develop incentives and other means to get boards of education and other agencies whose work relates to these goals to coordinate their services. School boards should be focused on the student achievement goals (and state standards when they come on line) and use them to help determine which programs to strengthen, which to pare down and which to eliminate and move to school-based budgeting. School budgets should be focused on the student achievement goals.
- Teacher unions and school boards should jointly review collective bargaining agreements and board rules and regulations for provisions that promote or hinder achievement of the student achievement goals.
- Staff development programs should focus on the subjects and skills called for in the student achievement goals and should be an ongoing component of the school program.
- Salary incentives that reward the accumulation of post-graduate education credits and degrees should be redesigned to reward the acquisition of content knowledge and pedagogical skills related to helping diverse students attain the achievement goals.
- Using current student outcome data as a start, local school districts should identify those schools that have the greatest distance to go in achieving the student achievement goals and ensure that they have the resources and help they need for their students to compete.
- Local districts and schools should use every available means to communicate to parents and other citizens the meaning of the shift from expectations of minimum competency to expectations of high performance and their roles and responsibilities in supporting student achievement.

We emphasize that this set of recommendations is just a preliminary step in rationalizing and improving the American education system. And none of these recommendations will amount to much unless the student achievement goals are clearly defined through content and performance standards and until they are embodied in curriculum frameworks that provide instructional guidance for schools. For it is easy to support the proposition that "US students will be first in the world in science and mathematics achievement" or that our "students will leave grades four, eight and twelve having demonstrated competency in challenging subject matter...." The real challenge is to reach agreement on what these words actually mean.

Recommendation #2

Develop standards for what students should know and be able to do as a result of their schooling and in order to be prepared for democratic citizenship, higher education, and productive employment.

By and large, neither this nation nor its states and communities have ever come to grips with what students should know and be able to do as a result of their schooling. Our major achievement in this area is state or local minimum competency standards — little achievement at all. Not surprisingly, we have been getting exactly what we have been asking for: minimal competency.

After ten years of education reform, this picture has not substantially brightened. This, too, is unsurprising. The central message of the volumes of laws and regulations that the states' education reforms rained down on schools was "Do more and do it better," which was to say "Do more of what is on the norm-referenced, standardized tests or minimum competency tests and make those scores better." And so our schools did. There was more teaching of low-level, generic basic skills, and students got better scores on multiple-choice tests of these skills. The problem was that most students still could not write a decent essay about the causes of World War II, solve multi-step math problems, or comprehend reading material along the lines of an editorial in a good newspaper.

We believe that education content and student performance standards represent the central issue in teaching and learning and in education policy. Every one of the world's high-achieving school systems makes clear its expectations for students and, in doing so, makes clear its expectations for schools, school staff, teacher education and for how education resources ought to be deployed. We in the United States do not. Every one of these other school systems also administers external student tests that are based on its education content standards and curricula and for which students can and must prepare. We do not. (Our closest approximation is, or was, the New York State Regents Examination system. Its past and present warrant careful investigation as a potential model for secondary-level assessments.) The efforts of every one of these school systems are reinforced by the universities and major employers in their nations through their "signalling" to students that hard work and achievement in school are valued and will be rewarded. Few of our colleges and even fewer employers emit such signals.[8]

We have paid a heavy price for our failure to grapple with the issue of what students should know and be able to do. One obvious manifestation is on international comparisons of student achievement. For example, we all know that the average performance of American students, particularly in math and science, is poor. American policymakers and the public typically assume that all the students being tested have been taught the same academic content. So when American students perform poorly, they conclude that our schools have done a poor job of teaching that content and our students a poor job of learning it relative to schools and students in other nations. What policymakers and the public do not know is that our students have *not* necessarily been taught that content. Indeed, one of the major, and largely undiscussed, reasons for differences in international educational achievement is differences in decisions about curriculum content — in other words, decisions about standards — different nations make. Our students perform poorly in part because it is hard to learn what you have not been taught.[9]

Put another way, when American and Japanese students who have studied the same topics in algebra are compared, our students do as well. The problem is that few American students are exposed to those topics in algebra because few have been prepared for doing so, while most Japanese students are taught advanced algebra because most have been prepared, starting at an early age. In short, Japan decided that all of its students could be brought along to study advanced mathematics, while the cumulative result of the decisions (or non-decisions) taken by our 50 states, 15,000 school districts and 100,000 schools was that relatively few students study advanced mathematics.

A major aspect, then, of achieving excellence in education is the content students are taught, the quality of that content and the standards of performance expected of students. The Strengthening of America Commission summarized the issue in this way:

> "To the extent we have educational content and student performance standards, their quality and rigor vary enormously by state, district, and school and are generally below the levels demanded in other advanced industrial societies. By and large, our elementary school students are fed a steady and repetitive diet of low-level basic skills, our college-bound students are not being prepared for college-level work, and our work-bound students get the kind of low-level educational fare that has dubbed them 'the forgotten half.'"[10]

Our laissez-faire approach to standards is not only a key reason for our poor average educational performance; it also helps explain the large gaps in achievement among racial and income groups in this nation. For the enormous variation in the quality and rigor of our education standards is not random; it is closely correlated to the wealth and education levels of our communities. Thus, while the standards that have been set for and achieved by students in more advantaged districts are inexcusably mediocre, they are nonetheless considerably higher than the standards found in communities where the nation's poor children live. Indeed, comparing the curricula and other instructional offerings in disadvantaged urban or rural districts and wealthy suburban districts is a sobering demonstration of what inequality of educational opportunity means. The children who need the benefits of education the most get the least, in large part because school districts with large concentrations of poor children do not get the resources commensurate with ensuring equal educational opportunity in the states. Developing a common core of standards that apply to all districts and schools in a state, rich and poor and those in between, is therefore not only a strategy for achieving excellence in education; it is also a means for moving forward on the nation's pursuit of equity. In fact, it is our firmest conviction that the prevailing dichotomy between excellence and equity in education is a false and unproductive one that has damaged our nation's competitiveness. The agendas must be joined.

Principles for Developing Standards

The following principles should guide the development of either national (not federal) education standards or state standards or some combination of the two:

▶ Standards should be developed with reference to the most exemplary content and performance standards of the nations whose expectations for and levels of student achievement exceed our own.

▶ Teachers, through their professional and disciplinary organizations, should have a major role in developing and reviewing content and performance standards and the model curriculum and other instructional materials needed to illustrate those standards.

▶ Standards should take account of what students need to know and be able to do to undertake real college-level work and, therefore, higher-education faculty should be involved in their development.

▶ Standards should take account of what students need to know and be able to do to qualify for high-skill, high-wage jobs and to function as productive and dignified workers and, therefore, employers and unions should be involved in their development.

▶ To maintain the openness and the "multiple chances" that characterize the American education system and because students learn in different ways, work-related and academic standards should be integrated and designed to maximize continuing education and vocational opportunities.

▶ Standards, whatever the subject, discipline or field, must embody the basic purpose of American public education: the development of free and equal citizens capable of assuming the rights and obligations of life in a pluralistic democracy.

▶ Standards should be public and understandable.

▶ Standards should be continually monitored and improved.

A Proposal for Developing and Adopting Standards

There has been much controversy over whether standards should be developed nationally (and about what this means) or state by state. In fact, both have been occurring. The mathematics standards of the National Council of Teachers of Mathematics — the first set of standards we have — is the result of the voluntary, self-funded effort of a disciplinary association. The California curriculum frameworks are the result of state action. The work underway in developing standards for history, civics, geography, English language arts, the arts, science and foreign languages is being funded by the US Department of Education and conducted by consortia of professional organizations, teachers and university scholars and public members.

All this activity is commendable and encouraging. But how do we coordinate it? By what criteria should we judge the products? How do we leaven the weakest efforts with the strongest and maximize quality? How do we get buy-in from states, districts and schools? How do we do all this in a way that acknowledges and respects the roles of federal, state and local governments in education?

We propose two possible ways. The first is to obtain Congressional authorization and funding for the National Education Goals Panel (NEGP) and of the National Education Standards and Assessments Council (NESAC) that NEGP proposes to create. NEGP is a bipartisan body that consists of eight governors, four members of Congress and two members of the Administration. It was created and charged by the President and the nation's governors to report on progress toward achieving the national education goals. NESAC would be comprised of education experts, public officials and representatives of the general public and would be responsible for certifying standards and assessments as "world class." NESAC itself would not actually develop standards and assessments. Rather, it would issue a sort of "good housekeeping" seal of approval to standards and to assessments based on these standards that are developed by states or disciplinary associations or other groups. Nor would NESAC mandate the adoption of standards and assessments it approved; adoption by states would be entirely voluntary.

NEGP already exists and has done yeoman work in getting the National Education Goals taken seriously and in keeping them before the public eye. Congressional authorization and funding would give this body added legitimacy and authority for its work and also bring the federal government in as a full partner in achieving the National Education Goals. NESAC, on the other hand, exists only as a proposal. We believe this proposal has merit, but we further believe that the creation of a national body to certify standards and assessments warrants and would benefit, both substantively and politically, from the kind of input afforded by the process of Congressional authorization.

An alternative to NESAC, which Congress should also explore, involves creating a compact of the states as the main body for certifying standards and assessments. The compact would consist of one delegate from each state, either the governor or the governor's designee, and would be chaired by the US Secretary of Education. It could be wholly funded by the federal government or in part by the states; at a minimum, state delegates would be expected to consult broadly in their respective states about proposed standards.

The state compact would be advised by technical experts and by a small national body that included at least two members of Congress, representatives of teachers, parents, business, labor and other relevant groups. After receiving recommendations to certify standards and assessments and after consulting within their states, members of the compact would vote, and a two-thirds vote would signify national certification.

Although individual states would be encouraged to submit for national certification the standards and assessments they may develop, neither the compact nor its advisory body would actually develop standards or assessments. As in the NESAC proposal, the compact's role would be to recognize and help refine the best work of others.

Finally, we urge Congress and others to consider the potential of these proposals for elevating states' standards for the preparation and licensure of teachers, for stimulating states to review the products of the National Board for Professional Teaching Standards, which is developing standards and assessments to certify highly accomplished teachers, and for disseminating the results of the National Assessment of Educational Progress exams and the background information that relates results to instructional and other practices.

Recommendation #3

Develop new assessments based on standards for what students should know and be able to do.

Despite the fact that American students are much tested, we have little information about what they know and can do. There are a number of reasons for this. Most school districts use commercial, norm-referenced tests, which measure student performance according to a norm established by the commercial testmaker before the tests were marketed. Scores on these tests show where students stand in relation to this norm — and supposedly in relation to other students — but they tell us nothing about whether a 13-year-old can handle beginning algebra or read and understand a good essay.

Of course, this is another way of saying that the standardized tests we now use are not linked to curriculum. But a moment's reflection shows that, in a standards-free, fragmented, non-system of education where virtually every district or school is free to devise (or not devise) its own curriculum, standardized tests would have to be curriculum-neutral. And they would have to be anchored at the lowest common denominator of skill and knowledge. As a result, tests, which should be a way for students to show — and find out — how well they have mastered the material they have been studying, are now disconnected from whatever real work goes on in the classroom.

However, though basically irrelevant to the curriculum, our most commonly used standardized and minimum competency tests do exercise a pernicious influence on teaching and learning. Since schools are judged by how well their students do on these tests, teachers are encouraged to use valuable class time coaching students on the kinds of questions they will face and giving them a chance to practice taking these tests. Indeed, in some schools, especially those with large populations of low-achieving youngsters, the instructional program is often indistinguishable from the content and format of the tests: There is broad coverage of isolated facts and lots of practice choosing the "right" answer and performing tasks that call only on low-level skills.

Clearly, new standards and new curriculum frameworks will require new kinds of tests. They must be tests that students can prepare for and that are worth preparing for. To this end, we should reconsider our exclusive reliance on multiple-choice tests. It may be unfair to put the entire blame for the shallowness of most of our standardized tests on the multiple-choice format: The Japanese use multiple-choice tests that are sophisticated and very demanding and so do some professional licensing bodies in the US. However, there are important skills that are impossible to test with multiple-choice questions, with writing being only the most obvious example.

There are many calls now for alternative assessments known as performance-based or authentic assessments. These assessments test students' mastery of the operations they learn about. They may present students with problems they have not previously met but which call on the skills, principles and information students are supposed to have acquired in the class. They may include student performances or portfolios of work done throughout the year. Supporters of alternative assessments point out that, whereas conventional assessments often call for nothing more than a regurgitating of information, the new assessments show whether students can put the information to use. Instead of being mere hurdles, they allow students to show — and experience — a mastery of the material they have learned and the skills they have attained.

But though these assessments are promising, they raise many questions that are, as yet, unanswered. For instance, can they be reliably used for accountability purposes beyond the classroom? Vermont, which has been a pioneer in developing statewide performance-based assessments, has found that there are problems with scoring reliability — that is, making sure that people across the state who are grading the assessments come up with comparable judgments of comparable student performances. Perhaps this is a problem that can be solved with better training; perhaps it goes deeper than that. We do not yet know.

Or consider that, for fairness and other purposes, we are accustomed to administering tests at the same time and under the same conditions. Yet some of the performance assessments being proposed would involve student work produced at different times and under different conditions. Can we use tests like these for individual student accountability and/or to compare schools or districts or states, as some claim, and attest to the validity of the results? Finally, but not exhaustively, we also need answers about the time and expense that performance-based assessments would involve.

In short, there is no question that we must move beyond simplistic kinds of standardized and minimum competency tests and that the additional expense of doing so would pay off. But we are also concerned that performance assessments are being overpromised as a technology that is capable of being the basis of everything from large-scale state and even national accountability systems to instructional improvement in the classroom — all without much evidence to back up the claims.

We therefore strongly recommend that development and use of performance assessments be accompanied by an experimental attitude and that the federal government and states make funds available to support the necessary research and *pilot testing.*

We also urge that careful attention be paid to the issue of comparability of assessment results from the individual student to the national levels. This issue was raised by the report of the National Council on Education Standards and Testing (NCEST), which noted that if assessments "are to be useful, comparable results should be available to all key levels, including individual students and their parents, schools, districts, states and the Nation."[11] We know that a single national or federal test could accomplish this, but NCEST rejected this approach and we concur. It would, in any case, be premature at this point. NCEST and others thought that we can use different state or regional tests and come up with comparable results. That may be possible if all states adopt the same standards, but there is uncertainty even over that. There is even greater uncertainty about producing comparable results if standards and assessments vary.[12]

We do not have the expertise to resolve these and other issues related to the creation of a national system of assessments. But we believe their technical and political significance warrants Congress' exploration of them when it takes up the National Education Goals and standards and assessment agenda and that it should provide the means for answering the questions raised by these issues.

The issues we face in devising an assessment system that will do what *we want, both in terms of student* learning and accountability, are difficult and complex. However, they are not insurmountable. The research and development needed before new models can be adopted can be expedited by adequate funding. We also have old models to draw on, most notably the old New York State Regents' examinations for secondary school students. These tests were tied to curriculum frameworks; students studied for them; and they were an important part of New York's reputation for educational excellence. We could find no evidence that anyone has taken advantage of the rich lessons, both good and bad, to be learned from experience with the Regents exams and so recommend that research dollars be invested in this line of inquiry.

We emphasize again that our cautious approach toward the development of a new system of assessment is not because of any misgivings over assessments or because we think that every conceivable technical question must have a definitive answer before we can proceed. Rather, it is because we fear that leaping before we look could lead to a crash that would shatter the window of opportunity for putting in place new and worthy assessments.

We therefore recommend that the following principles be used to guide the development and implementation of new assessments.

Principles

- There is a federal role in stimulating the development of new assessments and helping to ensure their technical quality and appropriate use, but the federal government should not directly develop, administer or otherwise control these assessments.
- Teachers, as well as technical experts, should have a major role in developing, reviewing and monitoring new assessments.
- Assessments must be directly based on standards; standards should not be inferred from assessments. That means standards and model curriculum frameworks should be developed and disseminated before new assessments based on them are given, other than for experimental purposes. Teachers must have the opportunity to teach and students to learn the knowledge and skills new assessments will call for.
- Assessments should move away from exclusive reliance on multiple-choice items toward more authentic methods of assessing students' knowledge and skills and their application. Assessments should measure student achievement, not ability or test-taking skills, and students should be able to prepare for them. Samples of assessment questions and tasks should be made public, along with samples of work demonstrating various levels of performance.
- In the early grades, poor performance on assessments should trigger additional help in meeting high standards and not an education based on low standards.
- At the secondary level, assessments should reflect the following mix: assessments that all students take in common and that are based on the high-level knowledge and skills all students need to have; and assessments that students choose to prepare for and take in order to demonstrate a higher level of mastery in their areas of concentration. Students should have multiple opportunities to meet standards, and they should not be held back from preparing to meet a higher standard in an area of strength or interest so long as they have met the common core standards or are working toward mastering the knowledge and skills in which they initially fell short.
- The National Assessment of Educational Progress (NAEP) should be preserved and strengthened as a national monitor of educational performance and our best source of trend lines in achievement. Congress should deliberate on whether the trial state NAEP should be made permanent and whether the NAEP governing board's new method of reporting NAEP results should be made permanent when the reports of the National Academy of Education and the General Accounting Office on these issues are available.

Recommendation #4

Develop the capacity of schools to achieve high standards by ensuring that they have the flexibility, expertise and resources they need to do so.

It is imperative to rethink educational policy and reform the US educational system, but individual schools are where individual students learn — or fail to. Unless we develop the capacity of schools to help students achieve high standards, we have little hope that our education system can fulfill its part in a high-skills, high-wages competitiveness strategy.

We believe that an important first step is for unions and school boards to work together to remove bureaucratic rules and requirements for standardized practices that inhibit flexibility and professionalism in the schools and that act as disincentives for teachers to work collegially and develop specific responses to the specific needs of students in their schools. There are a number of examples of such cooperation, but we also realize that it is easier said than done. Many rules and contract provisions have their genesis in abuses, so there is an understandable fear that these abuses would return if regulations were relaxed. School boards are accustomed to seeing union demands for deregulation as threats to their power and control, while unions are accustomed to seeing board demands for more flexible contracts as threats to their hard-won gains. Moreover, since most school board members run for election and all union officials do, both groups are mindful of the reactions of their constituents if they step out too far.

These are facts of life, but they are not unalterable. And we are encouraged by the fact that the school districts that have gone the greatest distance on reform are ones with strong unions and boards, and that behind most of the individual schools that are held up as models of innovation and success are unions and school boards that cooperated in helping to make the adjustments necessary for these schools to pursue their vision.[13]

School boards and unions now have especial incentives to cooperate on behalf of building the capacity of our schools to perform at much higher levels. One is some of the radical forms of charter school proposals that essentially do away with school boards and unions altogether. We see little evidence that supports the charter school movement's underlying assumption that governance is the root of our education problems, but we see every reason for school boards and unions to take this movement's message seriously.

Another message school boards and unions ought to take seriously comes from the private school choice movement, that is, the effort to allow public dollars to follow students to private and parochial schools. Again, we see little theoretical or practical evidence, from either here or abroad, to support the claims that private school choice would improve either achievement or equity in education or that "competition" between public and private schools would shape up public education. However, we believe that part of the impetus for and receptivity to these claims is the public's disgust over bureaucratic gridlock and business as usual in our schools. And unless the people who govern and work in public schools take this message to heart, they can expect to find increasing support for proposals to dismantle public education. There are, by now, many examples of troubled industries that managed to survive and prosper mainly because labor and management realized that business as usual meant death and working together meant work. Education must be the next sector to practice that lesson.

We also see an important role for business in helping districts develop the capacity of their schools to perform at high levels. While good data are not available to definitively uncover the extent of central bureaucracy and the resources it drains from direct services to children in schools, we are struck by the layers of managers in central offices who have authority over instructional matters that ought to be the responsibility of individual schools. We also suspect that many of the individuals who now have supervisory authority over teachers, curriculum, staff development and the like can serve more productively working in schools. However, we see very little appetite in school districts for getting a handle on these issues. Businesses, especially those that have had to restructure and become managerially leaner, could provide both political clout and technical expertise to assist districts in becoming more effective and efficient.

As for schools themselves, developing their capacity to get students to learn to high standards means that professional development must be a big priority. If we expect teachers to devise and teach curricula based on state or national curriculum frameworks, many will need a good deal of help — and the current model, featuring an "in-service" day or two a year, during which an "expert" lectures and offers a couple of workshops, is woefully inadequate. States and districts will have to ensure an adequate supply of professional development programs that are built around the content of the curriculum frameworks, as well as the pedagogy for teaching that content to students of differing achievement levels. But school teams ought to be given the authority to figure out their strengths and weaknesses relative to teaching to new standards and where to seek the kind of help they need.

Teachers consistently express hunger for high-quality professional development opportunities — and contempt for the meager, trendy fare they now mostly get. So we are confident that if states and districts invest in increasing the supply of such opportunities, including, especially, making use of expert teachers, the demand will be there. But we emphasize that payoff will depend largely on meeting two conditions: Professional development must be tied to the new standards and to strategies for teaching to them and teachers must be given adequate time to participate in programs that will improve their knowledge and skills. Just as productive industries invest in their employees, so too must the education system.

One method of stimulating both the demand for professional development tied to new standards and the quality of the supply is by redesigning the main incentive system we now have for continuing education: the requirement that teachers accumulate graduate credits over time to advance on the salary schedule. This has indeed been a powerful incentive system; the average American teacher has at least a master's degree. Yet continuing education for teachers is as fragmented and incoherent as the education system it is embedded in. Universities know they will have customers for their postgraduate education courses, no matter how irrelevant the courses are to teachers' needs. And since school districts and schools rarely have criteria for what kind of courses teachers should take to get salary increments, teachers' choices are typically constrained only by the fit between their schedules and university course schedules.

As we suggested earlier, a pay-for-knowledge system that rewards teachers and other staff for acquiring knowledge and skills required to teach to new standards would be a far more productive investment in continuing education than the one we make now. It would also send an important signal to the universities and other institutions teachers primarily rely on for continuing education credits that they must respond to the needs of teachers and school districts to continue to receive their patronage.[14] To these ends, school boards and unions should also consider creating incentives for teachers to seek advanced certification from the National Board for Professional Teaching Standards when the Board assessments come on line.

Building the capacity of schools requires not only more knowledgeable staff but more professional workplaces. As Smith and O'Day point out, "it will be impossible for major changes in the quality of schooling to take place if the quality of teacher workplaces continues to be as shabby as now."[15] For example, we are used to the practice of elementary teachers being with their classes and secondary teachers teaching back-to-back classes during the entire school day, except perhaps for a preparation period and a half-hour lunch break. We think every nation must do it that way. Yet it turns out that our teachers teach many more hours a day than, say, teachers in Japan. Harold Stevenson tells us that Japanese teachers are in charge of classes only 60 percent of the time they are in school; class hours are similar for teachers in other Asian schools Stevenson studied.[16] This gives teachers time to meet and plan lessons together — which is a very effective kind of professional development.

Nor do our schools provide much support for new teachers. They are thrown into classrooms to sink or swim, with no allowances made for their virtual lack of experience working in real classrooms with real youngsters. It is little wonder that so many of them leave during or right after their first year or that so many students suffer from the neophytes' trial and error. In contrast, new teachers in Germany spend most of their time observing experts and slowly gaining experience working with children.

Or consider that few schools have professional libraries for teachers or space for them to meet with their colleagues. Few teachers have access to telephones and other simple, inexpensive technology. And most teachers have to dig into their own pockets to make up for the constant shortfalls of supplies for their students.

It would take very little money to improve most of these conditions.

Yet because the needs and conditions of individual schools vary greatly, and because of the inefficiencies of most central school bureaucracies as they are presently organized, we believe that the best chance of addressing most of these problems is to give individual schools their own budgets. Staff may then decide what they need — staff development, new textbooks, laboratory equipment, computers and software, phones, photocopiers, etc. — to create the kinds of professional workplaces in which adults can concentrate on getting students to achieve higher standards. School staff may decide to purchase these services, equipment and supplies from the central office, which would now function as a service center. Or they might find better quality and prices from other sources. The important thing is to give them the authority and responsibility to decide for themselves what will enhance their schools' capacity to perform at high levels.

A Note on School Finance

In all too many school districts, none of this is possible without additional money. Indeed, in school districts serving high concentrations of poor children, lack of good textbooks, phones or photocopiers is only the tip of the problems created by our system of school finance.

The disgusting conditions in a large number of American schools are well-documented, but no one has described them as vividly as Jonathan Kozol in his book, *Savage Inequalities.*[17] Kozol talks about a high school and junior high school in East St. Louis, Illinois, that had to be closed twice in one week because sewage from backed-up toilets flooded the buildings. In New York City, he visited a school where the staircase became a waterfall when it rained and where blackboards were so badly damaged that teachers feared youngsters would cut their hands if they did boardwork. Many of the schools Kozol saw were incredibly crowded. One elementary school was a converted skating rink. Its "capacity" was 900 students, but 1,300 were going to school there in windowless rooms. Many schools did not even have enough books. A history teacher with 110 students had 26 textbooks, some of which were missing the first 100 pages. And close by all these schools were districts whose schools wanted for none of the basics and where computers in abundance, well-stocked libraries, Olympic-sized swimming pools and other luxuries were taken for granted.

The question of how money is spent is vitally important. And we know that money is not always spent wisely or efficiently. For example, research has failed to find a strong relationship between total dollars spent on education and student achievement. On the other hand, research has shown that having instructional materials and resources available to teachers is highly correlated with student achievement.[18] One possible conclusion is that available dollars are getting to classrooms on a differential basis, thereby obscuring the relationship between resources and outcomes. Some states or districts that have high expenditures may do a poor job of getting money inside classrooms, while others may have insufficient funds relative to their proportions of students with special needs — or both may be true simultaneously. There is little reliable research on how money is spent in education, and overcoming our lack of understanding of this issue should be a major priority for federal education research dollars.

In the meantime, we know many poor children are schooled in buildings that would not pass muster as facilities for livestock or criminals, and that money can turn that around; that small class size, especially at the elementary level, makes a positive difference in achievement; and that money can make that happen;[19] and that teacher quality relates to student achievement, but disadvantaged districts have a tough time attracting and retaining top-notch teachers — and that money makes a difference here.[20]

No nation has given more prominence to the ideal of equality of educational opportunity than this one, yet the American system of school finance is the most inequitable in the industrialized world. And despite more than 20 years worth of litigation over school finance equity since California's *Serrano v. Priest*, there is little progress to show for it.

To be sure, school finance has changed substantially. First, education funding during this period shifted from being primarily a local to a state responsibility; the states' share of education funding increased to more than 50 percent. (Some states continue to be well below that, but they are offset by others that are well above 50 percent, including Hawaii, which has a totally state-funded system.) Second, average per-pupil expenditures, adjusted for inflation, grew 43 percent between 1971 and 1985. Third, by 1985, all states funded services to students with disabilities, and many also paid for programs for educationally disadvantaged and non-English speaking youngsters, albeit all to a limited extent. Finally, many state education finance systems were revamped to distribute money between property-poor and property-rich districts more equitably.[21]

And yet, despite all these changes, there was little impact on the equity of education funding. There remain huge differences in spending among states, even when differences in their cost of living are considered; huge differences among states in terms of the proportion of personal income their residents devote to education; and huge differences within states — in Texas and Ohio, for example, the highest spending districts spend nearly triple the amount per pupil as the lowest spending districts, while in New York State, which invests substantial sums in education relative to most states, the difference between the amount the top- and bottom-spending districts devote per pupil is more than $6,000, or more than most states spend per pupil. And there are large spending differences within districts, as well.[22]

As Paul Barton put it:

> "...two dramas are being played on the stage of education. One is the national education reform effort, embodied in the goals set by the President and the governors for the year 2000. The other is the reshaping of education and educational finance systems by a [new] wave of litigation and state court decisions declaring these systems inequitable in the distribution of resources for education."[23]

We strongly believe that these two dramas must be joined. And we are convinced that without the infusion of new resources into overburdened districts that serve large concentrations of poor children, these children will once again be left behind, to our moral and economic peril. We further believe that the National Education Goals can give new direction and legitimacy to the school finance equity movement and help avoid the kinds of backlashes previous attempts at equity have engendered.

We have not taken up the issue of school finance equity in great detail. However, we think there is more to be gained both educationally and politically from leveling up strategies than from trying to limit spending by high-spending districts (or higher-spending schools in the case of intra-district equity). We therefore find the proposal recently made by William H. Clune particularly appealing.[24] States that are not under court scrutiny or the threat of it may consider it on their own. And as courts begin to hear the school finance equity cases now on the docket, they should give this proposal a close reading.

- States should guarantee a base program of substantially equal funding for at least 95 percent of the state's students, with that level of equalization maintained from year to year. The base program should include all instructional costs and costs with an impact on education, such as facilities. (Although a 100 percent standard is preferable, it has the effect of compelling wealthy districts to substantially reduce spending and thus makes them enemies of equity. Moreover, lower spending in one set of districts does not help the achievement of students in other districts and probably would depress the performance of wealthy districts.)
- State legislatures should adopt a substantial program of compensatory aid for children affected by poverty fully proportional to the number of disadvantaged students in a school.
- State legislatures should develop

performance-oriented policies designed to increase the probability that money is wisely spent and that educational resources will produce more effective education and gains in student achievement. Such policies would involve new and higher standards for curriculum content, teacher training, assessments and other components of a strategy for achieving the National Education Goals.

As these principles suggest, joining school finance reform to systemic education reform will not be inexpensive, and we know that many states are fiscally strapped. We also know that part of the reason is that the "new federalism" shifted a number of federal responsibilities onto the states without the resources to discharge them. We also note the decline in the federal share of education funding, from a high of about 10 percent during the late 1970s to about 6 percent today. Moreover, largely unfunded federal mandates, most notably the Individuals with Disabilities Act (formerly the Education for All Handicapped Children Act), have taken up a considerable share of the new funds the states raised for education during this period, while still leaving disadvantaged urban districts, which have the largest concentrations of children with special needs, struggling to pay for special education.

In short, many of our states and all of our poor districts need help if their schools are to develop the capacity required for America to achieve the National Education Goals. Federal assistance is needed and, in light of the federal government's historical responsibility for promoting equity and the national interest, it is legitimate.

One avenue for the federal government to explore is providing incentives for the states to reform their school finance systems along the lines we have suggested. Another is for the federal government to increase its share of the costs of special education, while seeking to remove the incentives that have been created to liberally apply that label to children.

We also believe that since immigration is a national issue and is governed by federal policies, there is a federal role in alleviating its impact on school districts. In disadvantaged school districts in particular, large influxes of poor immigrant children are overwhelming schools already suffering from overcrowding and cutbacks in services. If America is to continue to derive the strength immigrants have always provided it, these children, no less than others, must be educated to high standards. The schools that are responsible for doing the job will need special help.

We also recommend that the federal government include refurbishing decaying school facilities and building new ones in its infrastructure package. Moreover, federal investments in technology should at the very least include incentives for the transfer of technology to schools and training in its use. We are struck by the fact that chalk-and-talk is still the main technology in our classrooms. Even telephones are rare sights in schools. Technology, of course, does not teach by itself. Yet without it and the training to use it — and without major advances in producing quality educational software — schools will not be easily able to expand their curricular and instructional repertoires and make more productive use of their staff.

Recommendation #5

Develop the capacity of youngsters, particularly poor children, to meet high standards by removing the out-of-school barriers to learning.

One of the most robust and frequently replicated findings in education research is that, on average, children from impoverished and poorly educated families do not achieve as well as children from advantaged, educated families. There are a number of reasons for this, but chief among them is the very different and highly unequal formal (and informal) schooling experiences of advantaged and disadvantaged children. The education system therefore cannot be let off the hook for the low average achievement of poor children. On the other hand, neither can all the other institutions that poor children depend on: the family or health and social services agencies or the governments whose policies and levels of support shape the nature and strength of the social safety net.

There are more poor children in this nation today — 14,341,000 — than in any year since 1965, despite a net 88 percent growth in the Gross National Product. One in five American children lives in poverty, giving children the dubious distinction of being the poorest group of Americans.[25] This rate of increase and the appalling level of childhood poverty in this nation are first and foremost moral issues. On close inspection, however, childhood poverty also turns out to be an international competitiveness issue.

Compare, for example, the conditions of children in the US with those of children in Germany and Japan, two of our major economic competitors and among the nations most frequently cited for their educational achievement. In 1988, the year of the First International Mathematics Study, the poverty rate for American children was 17 percent and the rate for German children was 8 percent, less than half as great. The poverty rate for the one-fourth of US children who were in single-parent families was greater than 50 percent, compared to 35 percent for the one in seven German children who were in single-parent families. And fewer than 6 percent of Japanese children lived in single-parent families.[26]

We can say for sure that family structure and poverty have a major impact on the achievement of American children when we analyze results from our own tests. But do they account in any part for the poor performance of Americans relative to students in other nations?

As Richard Jaeger points out, international data on childhood poverty and educational achievement are sparse, and broad generalizations from sparse data are not warranted.[27] Yet analyses of the data we do have offer consistent and dramatic evidence on this question. For example, an analysis of the relationship between poverty rate and the average performance of German, British, Australian and American 13-year-olds on the First International Mathematics Study shows that virtually all — an astonishing 99 percent — of the variation in mean test scores is predicted by childhood poverty rate; and almost 60 percent of that variation is predicted by the poverty rate among children in single-parent families.[28]

Isabel V. Sawhill observes that: "Although wholesale attempts to turn back the family clock are unrealistic...some tempering of the pace of family change, some reassessment of its consequences, and much more attention to the consequences for the increasing number of children growing up in poor families are in order."[29] We agree. We also concur with her that "...government financial support for low-income working parents, additional funding for preventive health care and preschool education, and greater efforts to prevent early childbearing and enforce the child support obligations of absent parents have the greatest chances of success."[30]

In terms of specific programs that would help narrow the gap between poor children and their more advantaged peers, we urge:

▶ ***Expanding federal support for prenatal care and nutrition programs for women, infants and children.*** Studies show that for every $1 invested in the WIC program, for example, $3 is saved later in health costs. Prenatal care is critical for ensuring that poor mothers have healthy babies whose ability to learn is unimpaired. Also to this end, there must be much greater emphasis on drug treatment programs for addicted pregnant mothers. And federal school breakfast programs for poor children should be expanded to reflect increases in the number of poor children.

▶ ***Providing health care for every child who does not already have it.*** Poor children whose parents work at jobs where health insurance is not currently offered are likely to get poor medical and dental care. Any reform of the health care system must take their needs into account.

▶ ***Providing childhood immunization for every child whose family cannot afford it.*** Currently, 6 million children are not immunized, and diseases against which they should be protected are growing. An immunization program will be cost-effective: For every $1 invested, $10 will be saved in later medical expenses. Mobile facilities would make it possible to reach every preschool and elementary school child in the country.

▶ ***Fully funding Head Start so it is available to all eligible three- and four-year-old children, with a full-day option for those most in need, and ensuring that gains persist by expanding follow-through programs in the schools.*** To improve the efficacy of Head Start and to fulfill the conditions necessary for welfare reform to work, we urge adoption of intergenerational models, like the Even Start program, that provide education, employment and parenting skills programs for parents.

We are aware of the resource-driven tension in Head Start between serving all eligible youngsters and serving youngsters effectively by ensuring appropriate child-staff ratios and an adequate supply of qualified staff, to cite just two factors associated with effectiveness. We recommend as one way both of easing that tension and helping to expand Head Start that it be shifted from an exclusively poverty program to one that permits universal access, with poor children attending for free and other children on the basis of a sliding-scale fee. In addition to providing some of the additional resources needed to make quality Head Start programs available to all eligible youngsters, such a move may also promote more economically and racially integrated preschools.

▶ ***Coordinating the patchwork of services available to poor children and families, refocusing them on outcomes and redrawing delivery boundaries around school- or community-center catchment areas to increase access by poor families.*** Federal, state and local governments should give strong emphasis to strengthening families, and, where appropriate, connecting services to poor parents with services to their children. Health and social service agencies should be more directly focused on helping schools with the out-of-school problems of their students.

▶ ***Funding Chapter 1, the nation's main program for assisting school districts with large concentrations of poor children, to the level necessary to serve all high-poverty schools, and making it consistent with the overall strategy outlined here for achieving the National Education Goals.***

The Subcouncil did not sufficiently consider the role of parents in supporting their children's achievement in school to make recommendations. However, we are certain enough of the significance of that role to urge follow-up. Enforcing parental responsibilities in a society like ours is fraught with legal and moral and other perils and requires fresh public discussion. But just a few statistics about the impact of families on their children's achievement should underscore the need for that discussion.

- One in five children lives in a single-parent family, more than twice the proportion that did so in 1965: 17 percent of white children, 54 percent of African-American children and 28 percent of Hispanic children. The proportion of children in single-parent families varies widely among states. States that have higher proportions of such children show lower student achievement.[31]
- Youngsters spend 12 times as much time watching television as reading out of school. Outside reading is associated with academic achievement, and the amount students read varies considerably across states. Similarly, there is a strong relationship between amount of TV viewing and academic achievement, and considerable differences among states in their students' TV habits. States in which students do more outside reading and watch less TV have higher academic achievement.[32]
- Twenty percent of 8th graders are absent from school three or more days in a month. School absences and tardiness are related to low academic achievement.[33]

Recommendation #6

Develop an incentive and accountability system that uses the results of assessments administered on a sampling basis to signal the need for external intervention in school systems and schools that fail to make progress in getting their students to achieve high standards. School systems and schools that fail to benefit from additional help should be subject to accountability measures such as transferring or removing officials and staff, reorganizing or even closing schools (and reopening them with new staff and programs), while those that achieve should be rewarded.

Much of the controversy surrounding a national system of standards and assessments is fueled by anxiety over how assessment results would be used, that is, by accountability. That anxiety is entirely justified. America leads the world in idiotic and counterproductive accountability practices. For example, we use standardized tests to make decisions they were not designed to support, like tracking young children. We count tests that youngsters cannot prepare for and so discount students' work and achievement in school. We hold teachers accountable for the results of tests without giving them the tools necessary for success. And we let those who control the tools entirely off the hook.

An accountability system is only as good as the assessment system it is based on. If new accountability systems developed around a new system of standards and assessments are as educationally bankrupt and politically driven as our present ones, then we will continue to corrupt the very accountability we say we seek. If we give new assessments before we produce and disseminate new standards and use them as a substitute for high-quality curriculum and staff development, then students and teachers will continue to be mystified about and unable to do what's expected of them, and the result will be widespread failure.

We do not need another thermometer to tell us how sick we are; we need a system that helps us get well. On the other hand, if there is no accountability, and therefore no incentives, for students, schools and officials to improve their performance, it is doubtful that we will see results from a new system of standards and assessments because not enough people will pay attention. Certainly, they did not do so before.

Nothing about the way our education system was set up ruled out internal intervention in a failing school by local school officials, who have administrative responsibility for education. Central office administrators knew which schools in their district were doing well academically and which ones were in big trouble. It would have made a lot of sense for them to send in a team to find out what was causing the problem and to help overcome it. Perhaps the school had a terrible math program — or none at all — or maybe it was so overcrowded that the only thing the principal had the time and energy to do was maintain order. Or perhaps it was because the school had a disproportionate share of unqualified teachers the districts had hired. Yet school districts seldom tried to diagnose what was wrong with one of their schools or give staff in the school the time and help to figure it out for themselves. Nor was the likelihood great that the problems schools identified would have gotten addressed. Indeed, when a school's poor performance became public, the typical response of officials was to put the school through some school-improvement planning exercise, conducted by the very staff that was already floundering, or to add on some program. And the typical result was more paper on file and more paperwork requirements and more of the practices that failed to improve student achievement in the first place. It is understandable, then, that states stepped into this local accountability vacuum. Unfortunately, however, their methods have been pretty much the same.

A decent system of accountability will begin with a decent system of state assessments to monitor progress toward higher performance. These assessments have to measure student achievement in relation to what the schools are supposed to be teaching, in other words in relation to the state standards and curriculum frameworks. And they will need to produce information not only about average achievement in school districts but also about the variations in student achievement.

However, we do not agree that it is necessary for states to test every student in order to hold districts and schools accountable. The information that they need or that the federal government needs can be more efficiently obtained through testing samples of students at a number of grade levels. We want less frequent but far better testing, both in the quality of the assessments and the meaningfulness of the results.

The results of these assessments should be used as indicators of the progress of districts and schools in helping their students meet new achievement standards. (Obviously, it would make sense for districts to pay attention to their schools well before assessments are given.) If a district or school fails to make progress, a team composed of state education officials with expertise in education, a similarly qualified labor-management team from the local district, some outside education experts and some representatives of the public should investigate the sources of the problem. Team members should be authorized to make recommendations for change and arrange for the help the district or school needs to follow the recommendations. For example, teachers in a particular elementary school might need additional training before they are prepared to teach to the new math and science standards. Or a district may be insisting that schools use a particular curriculum or textbooks that do not reflect the new standards or is failing to provide schools with their share of the budget. The district or school would then have until the next assessment period or one beyond, depending on the team's recommendation, to make progress. And if, at the end of the specified time, no progress had been made, more drastic measures would be taken, including closing the school and reopening it with a new staff or, in the case of districts, recalling the school board and calling for a new election or new appointments or removing the superintendent.

The new accountability system should be more than a way of recognizing, helping and, if necessary, lowering the boom on schools that are failing. It should also reward districts and schools that make substantial progress, with money or other forms of recognition that experiments with incentives suggest. But having stated our preference for an incentive-based accountability system, we also recognize that not much is known about how incentives will motivate educators, while all too much is known about how such systems can be corrupted and corrupting. Nor do we have any reason to think that new assessments, no matter how good they are, would entirely lick the problem of narrowing teaching and learning if high stakes are attached to them.

The model we have suggested, which is inspired in part by the one used by the International Monetary Fund, attempts to address these issues by balancing technical with human judgment. We believe it needs work but is workable. Above all, however, we urge careful monitoring and renewal of any accountability system that includes incentives, both positive and negative, to ensure that it is producing the kinds of behavior we value.

Recommendation #7

Develop a "medium stakes" student incentive and accountability system that is based in part on individual assessment results at the secondary school level, and motivate universities and employers to reward effort and achievement in high school.

Most people are willing to talk about adult accountability for the education children get. Blame is parcelled out among teachers, principals, school districts and, occasionally, beyond — and this is fair enough. But few are willing to entertain the idea that students are, in any way, accountable for their own learning. The prevailing idea seems to be that if students do not come to school or write assigned essays or study for exams, it is the fault of the adults in the system, who have not found a way to motivate them.

That proposition sounds fair and humane, but what it really does is deprive students of any responsibility for their own actions — hardly a lesson schools should be teaching students at all and certainly not as a matter of principle. Most parents begin trying to teach their children that actions, and failures to act, have consequences when the children are very young. Schools should be reinforcing that lesson.

Moving to a standards-driven education system in which only the adults in the system are accountable will not convince students that they need to take school seriously. Working hard and achieving in school must count for them, too. Yet currently, American high school students who plan to go on to college do not need to work hard and get good grades in order to achieve their goal. Except for the tiny percentage of kids who want to go to selective colleges, students know that, no matter how poor their grades, they will be able to find a college that will accept them. If most colleges continue to admit students who have done little or no work in high school, there is no reason to expect any change in student behavior.

The vast majority of employers give exactly the same message to students going directly from high school to work: What you did in high school does not count. As John Bishop has pointed out, few top-notch companies hire recent graduates even for entry-level jobs; they look for people in their early twenties who already have a few years of work experience.[34] So new graduates who have worked hard find themselves competing for the same minimum-wage, dead-end jobs as kids who slept their way through school — when they bothered to come at all. Hardworking kids do not even have the edge since very few employers ever inquire about what courses a young applicant took or ask to see a transcript.

In short, neither our college-bound students nor the youngsters who go right from school to work are given any incentive to work hard in high school. Some people believe that students should not need external incentives — they should be motivated by a desire to learn (and perhaps by their excellent teachers). But if Congress passed a law tomorrow saying that working adults would continue to draw their salaries, whether or not they ever put in another day at the job, how many people would continue going to work every day? If most young people need external incentives to spur them on, they are not much different in that from most adults.

The array of incentives other industrialized nations employ is, again, instructive. Students who wish to enter university in Germany or France or England or Japan must pass demanding, curriculum-based examinations that determine whether or not they have met the educational standards. The German Federal Employment Office uses school grades in deciding which students to recommend for various apprenticeships, and participating employers also use grades, as well as tests administered by the company. In Japan, there are formal links between high schools and employers for the purpose of matching qualified recent graduates and companies that have jobs.[35]

We are not suggesting that the United States try to reproduce the arrangements that are working in these other countries. Many of them foreclose students' opportunities at an early age or rely on examinations to the exclusion of everything else. Neither of these is desirable here. But there are many ways to link high school and what comes after while remaining faithful to America's commitment to offer second and third or more chances. Both that linkage and commitment are essential if we expect students to take school seriously and stick to it if at first they flounder.

We therefore recommend that:

▶ External assessments be given to individual students at the secondary level and that the results should be a major but not exclusive factor in qualifying for college and for better jobs at better wages; course grades, conduct and teacher recommendations also should count. This system should be phased in over about a 10-12-year period, at which point no one who qualifies for college should be denied access because of inability to pay, and no one who enters a community college or the work force directly from secondary school should be denied continuing opportunities to qualify for college.

- Colleges and universities should be encouraged to raise their admissions standards over a 10 to 12-year period to reinforce the lower education system's new standards. One possible means for doing so that also would reward student achievement is for the federal and state governments to offer more favorable higher education financial aid terms to students who meet standards.
- No student who meets standards should be denied the opportunity for a higher education because of financial reasons.
- Employers should be encouraged to review school records in making hiring decisions and offer better jobs at better wages to students who meet standards.

A Note about the School-to-Work Transition

The United States does the poorest job in the advanced industrial world of facilitating students' transition from school to work. With the exception of those lucky enough to be in the handful of outstanding programs that integrate academic and vocational learning, the approximately 50 percent of youth who are not directly headed for post-secondary education are our "forgotten half." They are either in our high schools' general track, whose sub-minimal requirements and watered-down courses amount to little more than a time-in-the-seat educational standard. Or they are in vocational programs that mostly teach obsolete skills on obsolete equipment and ignore academics altogether. And when students graduate from high-quality vocational education programs, they are rarely hired for good jobs until they are well into their twenties.[36]

This pathetic picture is in part attributable to our high schools' orientation toward the college bound, to their tradition of academic education that is passive and decontextualized, to their assumption that students who do not readily learn in traditional ways are not capable learners and to their isolation from the world of employers. But employers are also culpable. Employers have isolated themselves from schools and are indifferent to academic excellence in hiring high school graduates. And many have demonstrated a preference for de-skilling work, particularly entry-level jobs, rather than investing in helping workers to acquire new skills.

As we noted earlier, few employers hire youths under the age of 20 for full-time jobs, and good employers — those who pay decently and offer fringe benefits and promotional opportunities — mostly do not hire recent high school graduates. High school graduates typically have to wait until they are 21-24 years old before they are even considered for a decent job. In the meantime, they float in the churning sea of a youth labor market that is mostly made up of poorly paid, high-turnover jobs with few fringe benefits and opportunity for advancement, often in the service and retail sectors. And since the jobs they were once considered for when they reached 21-24 years of age now go increasingly to college graduates, high school graduates find themselves perpetually in that sea and sinking fast: The incomes (in real dollars) of young workers who do not have a college education have been dropping sharply over the last two decades.[37]

A society that does not systematically provide for entry of its young into economic adulthood is courting trouble. The United States has never made such provision, but our vastly superior economic standing relative to the rest of the world kept us from paying the price for our neglect. That bill has now come due. Our society is failing to develop the human talent it needs to compete economically in ways that continually improve all our citizens' standard of living. Income inequality has increased sharply. And non-college-educated youth have been caught in the vise created by the simultaneous de-skilling of work and the upgrading of the knowledge and skills necessary to be hired for high-paying jobs. It is little wonder, then, that it has become so difficult for them to become established in the work world, achieve independence, and form and support families.

The school-to-work transition is thus implicated in the central question posed by the *America's Choice* report: high skills or low wages?[18] Answering that question affirmatively, that is, choosing both high skills and high wages, will require new efforts both by schools and employers. And the fact that there are a number of excellent examples of such efforts indicates that the job is doable. Still, America has had no experience with a school-to-work transition system. Moreover, while relations between the worlds of schools and work have improved greatly over the past few years of education reform, mutual distrust and unfamiliarity remain prevalent. There are many pedagogical and organizational issues still to be sorted out about how to prepare youth for work and about the assignment of roles and responsibilities for the task. We are convinced, however, that this job must be done. Providing for the school-to-work transition is a critical part of achieving the National Education Goals, improving individual and national economic competitiveness, and renewing American ethics about the value and rewards of education and work.

Principles to Guide the Creation of a School-to-Work Transition System

Time did not permit the Education Subcouncil to follow up its examination of the school-to-work issue with detailed recommendations. (For a discussion of how such a system might work primarily for individuals who are no longer in school, see the Report of the Training Subcouncil.) Instead, we offer a number of observations and principles to help guide the emerging effort to build such a system, especially as it pertains to in-school youth.

Our foremost plea is for clarity. In reviewing some recent discussions about the school-to-work transition, we find a tendency to view high school and postsecondary students, dropouts, and entry-level workers as an undifferentiated mass whose education and training needs can be addressed through a single policy or program. To create a school-to-work transition *system*, there must be a consistent response across these populations and across the institutions that may serve them, as well as a close articulation between educational standards and whatever occupational certifications may be developed. But we will do none of these groups a favor if we automatically assume that their education and training needs are identical or that all of the institutions that may be called on to comprise a school-to-work transition system — secondary and postsecondary schools, employers, unions, community-based organizations or others — are equally suited for the roles and responsibilities involved in providing education and training.

There is a similar need for clarity in using the term "apprenticeship." Based in part on admiration for the success of the German model, there is a consensus emerging that apprenticeship is the way to handle the school-to-work transition here as well. We, too, find merit in the idea. And there is a tradition of apprenticeship in this country. On the other hand, that tradition has been waning in this and other English-speaking nations for quite some time. Most active American apprenticeship programs are either run by unions or jointly by unions and employers. And unlike German apprenticeships, they are not aimed at high-school youth. Indeed, entry requirements for many of these apprenticeships now call for a level of knowledge and skills typically associated with a post-secondary degree. It is understandable, then, that many labor unions, for whom apprenticeship is a term of art, are suspicious of recent calls for apprenticeships for in-school youth and see in them an effort to dilute the standards of their programs or a false promise about the jobs youth would qualify for.

Many apprenticeship advocates are now careful to append the term "youth" to the phrase to distinguish between traditional apprenticeships and newer models. As Richard Kazis defines youth apprenticeship, it is a "learning program for young people, age 16 and older, that combines on-the-job learning with classroom instruction, that bridges secondary and post-secondary schooling, and that results in certification of mastery of work skills."[39]

> "Like traditional apprenticeship, youth apprenticeship relies on a pedagogy of learning by doing and of learning in a real work context through guidance by an expert. And like traditional apprenticeship, youth apprenticeship provides structured entry into the world of work and career advancement.
>
> Unlike traditional apprenticeship in this country, youth apprenticeship begins with in-school youth and continues into post-secondary education. As such, the in-school component of the program carries much greater weight and centrality than in traditional apprenticeship."[40]

We agree with this approach, but, as James E. Rosenbaum observes, it "does not guarantee that schools provide adequate academic skills to meet job demands, or that workplaces provide adequate skills training."[41] In fact, few employers have demonstrated interest in investing the resources and time, including the time of their adult employees, necessary for providing suitable training opportunities for high schoolers. And although employers are becoming more receptive to the idea, they have little experience with how to carry it out. By the same token, schools remain substantially isolated from and even suspicious of the demands of employers. And while this picture, too, is improving, it remains the case that relatively few teachers are prepared to integrate academic and vocational instruction and thus support both the educational and training needs of youth apprentices.

The only insurmountable obstacle to solving these problems is pretending either that they do not exist or that we know *the* solution. We therefore agree with Paul Barton: No single "program can fill a void so large and so long lasting as the one created by our historic failure to create a system to provide for the transition from school to work."[42] We recommend, then, that instead of either running with one model or anointing as a *bona fide* school-to-work transition model any program clever enough to use the latest buzz words, a set of principles should be elaborated to guide decisions about expanding existing programs and building new ones. Those principles would include that programs must:

- ▶ keep open the college-going option for youth, whether initially exercised or not;
- ▶ integrate academic and vocational learning;
- ▶ integrate school- and work-based learning experiences; and
- ▶ link effort and achievement in school with good jobs.

As these principles imply, building a school-to-work transition system in a decentralized nation in which neither schools nor employers or government has much experience with the task requires a collaborative approach. Our central proposition, then, is that school systems and employers (working with unions, where they exist), spurred by or in partnership with government, must jointly design approaches in which they share responsibilities for preparing youth for entry into employment in the primary market and in facilitating that entry when they are prepared.[43] That is the common thread of the markedly diverse approaches our competitors have to the school-to-work transition, and that is the thread with which we may fashion an effective and appropriate system here.

We doubt that "one best system" for discharging those roles and responsibilities can be found, at least not during this nascent stage of our experience with providing for the school-to-work transition. But as youth apprenticeship, career academies, Tech Prep programs, model cooperative education and vocational programs, and other efforts that come closest to fitting the principles suggest, the roles and responsibilities of schools or school systems and employers or government do not have to be standardized; the balance is different in each of these programs.[44]

As Barton notes, collaboration can result in different forms and different degrees of school and employer responsibility. It can occur between one school and a number of employers and their unions, in a whole community and in a whole state. It can use existing bodies where these groups already interact, or it may require the creation of new ones. And while it cannot be created solely by federal or state legislation, since employer involvement cannot be legislated, it can be aided that way, both directly in the form of resources for schools and indirectly through incentives for employers; in the latter case allowing an investment tax credit to apply to employers' costs of properly participating in school-to-work programs should be explored. And to ensure an adequate supply of work-experience opportunities, it can include the public as well as the private sector.

Any of the forms collaboration might take — so long as it adheres to the principles and is done seriously and in good faith — would represent a major step toward fulfilling our neglected responsibility to the "forgotten half." It is important to note, however, that we are not proposing a school-to-work transition system as an alternative to having work-bound youth meet high academic standards. Without the academic knowledge and skills necessary to enter postsecondary programs or otherwise advance in their chosen occupations, these youth will be only marginally better off than they are today. Without an emphasis on helping these students achieve high standards in the design of school-to-work programs, schools will continue to be off the hook for educating these students. And without a commitment by employers to reward hard work and achievement in high school in their hiring decisions, students will continue to fail to see the relationship between effort and consequences.

We conclude with a few additional observations. The first is that there is a desperate need in our secondary schools for occupational information and counseling services. Students not immediately bound for college get little in the way of occupational counseling and know appallingly little about career opportunities and requirements and their rights and responsibilities on the job. In school districts that serve large numbers of poor youth, many of whom have no familial or other informal ties to the world of work, there is often only one counselor for every 300 or 400 students or even more. And most of these counselors, like counselors in more advantaged districts, are oriented to the college bound; they do not have the information or contacts necessary to connect youth to the world of work. In poor rural districts, this problem is compounded by the fact that the work information and contacts students and school staff have often do not extend beyond the one employer in the area. Students need counselors with up-to-date information about available and emerging local and regional jobs and their wage and other prospects, about what employers expect and how to prepare for jobs. And since no person can keep up fully with the labor market, we need technology with appropriate information systems to extend both counselors' and students' reach.

We also need a student record for employers that is as meaningful to them as high school transcripts, results on SAT or ACT or Advanced Placement exams, teacher recommendations, and college application essays seem to be for higher education admissions officers. The most that work-bound students leave high school with is their diploma. They do not think to ask for anything more because schools do not encourage them to do so and employers do not ask for any other information. This is a disservice both to students and to employers.

We would prefer to see as little difference as possible in the records asked for by colleges and employers, though the format of these records could vary. Colleges are interested in courses and grades, in extracurricular and volunteer activities, recommendations from teachers, work experiences, test results and the like. These should also interest employers and would be useful to them. Unfortunately, today's high school transcripts would likely be indecipherable to employers, and the slow speed at which many schools now get them out would be frustrating. These must change.

Finally, we note the many proposals for school-to-work transition systems that call for the development of occupational skill standards and assessments to certify those skills or tests of generic workplace skills, such as scheduling or managing systems.[45] We did not have time to consider the issues raised by these proposals in depth, but in our judgment they do require revisiting. For example, we are disturbed by the tendency to talk about occupational skill certification for high school and postsecondary students in the same breath. This may be appropriate, but it may not be, given the mission of the K-12 school system. We are also disturbed by the tendency to gloss over the fact that different entry-level jobs have different levels of skill requirements, and different employers have different views about what constitutes a qualified entry-level worker. This may be resolved by clustering skills standards and assessments of their attainment into different occupational groups. On the other hand, this still may be too broad to be workable in an economy as large, complex, diverse and fast-changing as this one.

Some work-related assessments of high-school youth are already under development, but thoughtful discussion of these issues has not taken place. We think it should. For while we are sympathetic to the desire for new and more reliable and useful forms of certification, the recent fervor for credentialism has had a chilling effect on airing and getting answers to tough questions. The discussion that ensued in our Subcouncil from merely raising these questions convinced us that they, as well as others, are worth pursuing and that there is still considerable clarity that needs to be brought to the issue of certifying occupational or generic workplace skills.

Notes

1. The International Assessment of Educational Progress, Educational Testing Service, "Learning Mathematics," prepared for the National Center for Education Statistics, US Department of Education, and the National Science Foundation, February 1992; The International Assessment of Educational Progress, Educational Testing Service, "Learning Science," prepared for the National Center for Education Statistics, US Department of Education, and the National Science Foundation, February 1992; National Endowment for the Humanities, *National Tests: What Other Countries Expect Their Students to Know* (Washington, DC: National Endowment for the Humanities, 1991); Harold W. Stevenson and James W. Stigler, *The Learning Gap: Why Our Schools Are Failing and What We Can Learn from Japanese and Chinese Education* (New York: Summit Books, 1992); Harold W. Stevenson, "Learning from Asian Schools," *Scientific American*, December 1992, pp. 70-76; and Iris C. Rotberg, "Myths in International Comparisons of Science and Mathematics Achievement," *The Bridge*, Vol. 21 (Washington, DC: National Academy of Engineering, 1991).
2. John Bishop, "Why the Apathy in American High Schools?" *Educational Researcher*, January-February 1989, pp. 6-10; and Daniel J. Singal, "The Other Crisis in Education," *The Atlantic Monthly*, November 1991.
3. Marshall S. Smith and Jennifer O'Day, "Systemic School Reform," in *Politics of Education Yearbook 1990* (Bristol, PA: Taylor & Francis Ltd., 1990) p. 237. See also: John E. Chubb and Terry M. Moe, *Politics, Markets and America's Schools* (Washington, DC: The Brookings Institution, 1990).
4. *Ibid.*, p. 237.
5. *Ibid.*
6. *Ibid.*, p. 238.
7. *Ibid.*
8. See, for example, Bishop, *op. cit.*; James E. Rosenbaum, "What If Good Jobs Depended on Good Grades?" *American Educator*, Winter 1989.
9. Ian Westbury, "Comparing American and Japanese Achievement: Is the United States Really a Low Achiever?" *Educational Researcher*, June-July 1992; and Rotberg, *op. cit.*
10. *The Strengthening of America Commission First Report* (Washington, DC: Center for Strategic and International Studies, 1992) p. 104.
11. The National Council on Education Standards and Testing, *Raising Standards for American Education* (Washington, DC: US Government Printing Office, January 24, 1992) pp. 6-7.
12. Robert J. Mislevy, *Linking Educational Assessments: Concepts, Issues, Methods, and Prospects* (Princeton, N.J.: Educational Testing Service, December 1992); and US General Accounting Office, *Student Testing: Current Extent and Expenditures, With Cost Estimates for a National Examination* (Washington, DC: US General Accounting Office, January 1993).
13. Paul T. Hill, Arthur E. Wise and Leslie Shapiro, *Educational Progress: Cities Mobilize to Improve Their Schools* (Santa Monica, CA: Rand Corporation, March 1989).
14. The Subcouncil did not have time to consider pre-service teacher education in depth. Our preliminary look convinced us, however, that there is a grave need to fundamentally overhaul the teacher education and state licensure system. The lines we suggest that this overhaul take are the same as those we recommend for the education system more generally, that is, redesigning teacher education and licensure requirements to reflect the content and skills called for by new standards and curriculum frameworks. We also hope that such a move would end the unproductive debate about whether prospective teachers need to know academic content or pedagogy. The fact is they need to know both, and neither is well taught in most colleges and universities today.
15. Smith and O'Day, *op. cit.* p. 244.
16. Harold W. Stevenson, "Learning from Asian Schools," *op. cit.*
17. Jonathan Kozol, *Savage Inequalities: Children in America's Schools* (New York: Crown Publishers, Inc., 1991).
18. Educational Testing Service, Policy Information Center, *The State of Inequality* (Princeton, N.J., Educational Testing Service, 1991).
19. Jeremy D. Finn, et al., "Carry-Over Effects of Small Classes," *Peabody Journal of Education*, Vol. 67, No. 1, (Fall 1989), and Ronald F. Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal on Legislation*, Summer 1991.
20. Ferguson, *op. cit.*, and David Card and Alan Krueger, *Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States*, Working Paper No. 3358 (Cambridge, MA: National Bureau of Economic Research, Inc., May 1990).
21. Educational Testing Service, *The State of Inequality*, *op. cit.*
22. *Ibid.*
23. *Ibid.*
24. William H. Clune, "New Answers to Hard Questions Posed by *Rodriguez*: Ending the Separation of School Finance and Educational Policy by Bridging the Gap Between Wrong and Remedy," *Connecticut Law Review*, Vol. 24, No. 3 (Spring 1992).

25. Children's Defense Fund, *The State of America's Children, 1992: Leave No Child Behind* (Washington, DC: Children's Defense Fund, 1992) pp. ix-x; and Center for the Study of Social Policy, *Kids Count Data Book: State Profiles of Child Well-Being* (Washington, DC: Center for the Study of Social Policy, 1992).

26. Richard M. Jaeger, "'World Class' Standards, Choice and Privatization: Weak Measurement Serving Presumptive Policy," paper presented at the 1992 annual meeting of the American Educational Research Association, San Francisco, April 20-24, pp. 13-14; See also David Berliner, "Educational Reform in an Era of Disinformation," paper presented at the meetings of the American Association of Colleges for Teacher Education, San Antonio, Texas, February 1992.

27. Jaeger, *op. cit.*, pp. 15-16.

28. *Ibid.*

29. Isabel V. Sawhill, "Young Children and Families," in *Setting Domestic Priorities: What Can Government Do?* eds. Henry Aaron and Charles Schultze (Washington, DC: The Brookings Institution, 1991) p. 151.

30. *Ibid.*

31. Educational Testing Service, Policy Information Center, *America's Smallest School: The Family* (Princeton, N.J.: Educational Testing Service, 1992).

32. *Ibid.*

33. *Ibid.*

34. Bishop, *op. cit.*

35. National Endowment for the Humanities, *op. cit.*; James E. Rosenbaum, "Guidelines for Effective School-Employer Linkages for Apprenticeship," in *Youth Apprenticeship in America: Guidelines for Building an Effective System* (Washington, DC: William T. Grant Foundation, 1992); and James E. Rosenbaum and Takehiko Kariya, "From High School to Work: Market and Institutional Mechanisms in Japan," *American Journal of Sociology*, Vol. 94, No. 6, (May 1989).

36. Commission on Youth and America's Future, *The Forgotten Half: Non-College Youth in America* (William T. Grant Foundation, Washington, DC: January 1988).

37. Daniel E. Hecker, "Reconciling Conflicting Data on Jobs for College Graduates," *Monthly Labor Review*, July 1992.

38. Commission of the Skills of the American Workforce, *America's Choice: High Skills or Low Wages!* (Rochester, N.Y., National Center on Education and the Economy, June 1990).

39. Richard Kazis, "A Commentary," in *Youth Apprenticeship in America, op. cit.*

40. *Ibid.*, p. 68.

41. James E. Rosenbaum, "Apprenticeship Learning: Principles for Connecting Schools and Work Places," in Rosenbaum, et al., *Youth Apprenticeship in America: Guidelines for Building an Effective System*, p. 1.

42. Paul Barton, Memo prepared for the October 19, 1992, meeting of the Education Subcouncil of the Competitiveness Policy Council, p. 5.

43. Paul Barton, *op. cit.*

44. Richard Kazis comments about Jobs for the Future demonstration sites that are already national models for integrating school and work: "We see universal interest in expanding, improving, and systematizing the work-based component of these programs in order to better serve, better motivate, and better prepare participating students." This makes sense. But this also entails a greater role and responsibility for employers, which most employers are not yet willing to assume. Success, however, breeds success. Employers may participate only minimally at first — though participate they must if the program is to stand a chance — but that is the beginning of moving toward the kind of relationships Kazis recommends. (Kazis, *op. cit.*)

45. See, for example, US Department of Labor, The Secretary's Commission on Achieving Necessary Skills, *Learning a Living: A Blueprint for High Performance* (Washington, DC: US Government Printing Office, April 1992).

Albert Shanker
President
American Federation of Teachers
555 New Jersey Avenue, N.W.
Washington, D.C. 20001

Dear Al:

I have now reviewed the report of the Education Subcouncil. I agree with 90 percent of what is included therein, and most of that enthusiastically. What follows concerns only the parts I do not agree with and cannot associate myself with. Let me note that I feel as strongly about these points as I do about the many parts I endorse.

1. Page 13, third column, first bullet, ending "...for exemplary experienced teachers"

This Board, while based on an indisputably good idea, has yet to evaluate a single teacher. Union-dominated, it also risks becoming a permanent dependency of the federal government, like so many other outfits, as well as setting a dubious precedent for subsidizing the "boards" of innumerable other professions. I hope it succeeds in its mission but as yet it warrants no blank check from Uncle Sam.

2. Page 14, paragraph ending "...minimal competency".

Minimum competency standards are better than no standards at all, which is what we mostly had before states and localities began creating them. Granted, they're nowhere near demanding enough, but at least the mechanism and precedent exist. Psychologist and testing expert Barbara Lerner persuasively argues that minimum competency standards (and tests based on these) work fine, but we need to set them higher.

3. Page 16, column one, sentence beginning "The children who need... in the states

No one would deny that educational resources are spread unevenly within and among states (and surprisingly often, within local school systems). But there is no simple correlation between the places where the neediest children attend school and those where the least money is being spent today. In a number of states, the big urban school systems, serving the most sorely 'at risk' youngsters, have per pupil spending levels in the upper part of the statewide range. Fancy suburbs tend to be the highest spenders but big cities are often second, with small towns and rural areas much nearer the bottom. Simply redistributing resources won't necessarily benefit the largest numbers of poor and minority students. Hence the argument being made here is disingenuous in one of two ways: either following the apparent advice won't solve the problem, or the real advice is to spend lots more money.

4. Page 20, column one, paragraph ending "...will call for"

In an ideal world, standards would indeed precede assessments. Sometimes, however, it's reasonable to superimpose standards on assessments that already exist. People do that all the time with SAT scores, Advanced Placement results, and various state achievement tests. You have often used the results of the National Assessment of Educational Progress in your own column to make standards-based inferences about how the nation's education system is doing. The National Assessment Governing Board has piloted "achievement levels" as a way of saying to the public, with respect to NAEP results, "How good is good enough?" Inasmuch as we don't yet inhabit an ideal world, and the new standard-setting processes recently launched will take many years to mature, we'd better make some progress in the meantime based on the measuring sticks and assessments that we've got. And if we have standards in mind when we look for that progress we'll have a much clearer picture of how we're doing.

5. Page 20, second column, second bullet, ending "on these issues are available."

The Subcouncil errs gravely in supposing either that Congress has displayed great interest, understanding or wisdom with respect to National Assessment, or that its capabilities will be significantly enhanced by forthcoming reports by the National Academy of Education and the General Accounting Office. The latter, in particular, is as unprofessional and one-sided a hatchet job as that increasingly politicized agency has ever done. The former is a tedious batch of technical studies revealing mostly that when academics are put in charge of an issue, the best nearly always becomes the enemy of the good. The fact is that today the National Assessment is the only means in sight of tracking educational achievement (vis-a-vis the national goals and otherwise) at the national and state levels, and the achievement levels set by the National Assessment Governing Board are the only extant interpretation of what the President and governors may have had in mind when they referred—in Goal #3—to students achieving "competence in challenging subject matter" in key subjects. To ignore, set aside or defer these activities—the likely result of following the Subcouncil's recommendation here—is to destine the U.S. to no useful student achievement data for the balance of this decade.

6. Page 21, column one, third paragraph

Darn right there's little evidence about the efficacy of charter schools and their underlying assumptions. That's because the idea is still in its infancy and hasn't had time to grow up and generate any! If the Subcouncil has its way, it never will. But unless and until we try charter schools on a substantial scale, we won't ever know how they work or what difference they make. It's ridiculous to fault an idea that hasn't been tried for not yet having garnered evidence as to its efficacy.

7. Page 21, column one, last paragraph, discussion on school choice.

Once again—and without wading into all the merits and arguments that in my view make school choice an important and promising idea—it needs to be pointed out that the reason there's so little evidence today is because so little has yet been attempted. A handful of fairly recent "public school choice" schemes are now underway, but essentially none (save for a tiny experiment in Milwaukee) includes private schools. It's disingenuous in the extreme to fault choice proponents for not having generated much evidence. The opponents of even trying the idea have prevented that evidence from being gathered. Perhaps they fear what it would show.

8. Page 23, column three, second paragaph starting "In the meantime..."

Money can do some things, not others. The evidence on just what and how much educational improvement is bought with added spending is ambiguous—to put it mildly. Sure, dollars can fix the roof, and that's generally a fine thing to do. But that won't necessarily boost learning. The studies of class size reduction show extremely uneven and often unpromising results; here the Subcouncil is relying on a single Tennessee study that happened to come out the way the Subcouncil majority hoped.

9. Page 24, bottom of second column, starting "We have not taken up..."

"Leveling up" means spending more in toto, rather that redistributing what's now being spent. For states that can afford this, I say go right ahead. But many cannot—or they have more pressing uses for their spare change, or they've identified more "targeted" and perhaps, more efficacious ways to channel it into education. As for the federal government, if we're seriously interested in boosting national competitiveness we probably ought not make recommendations that would deepen the deficit.

10. Page 25, bottom of first column, starting "in short..."

It's easy to issue a blanket call for "federal assistance", quite another to find the funding, work out the formulas, etc. Absent such details, it's simply irresponsible to demand a blank check in this manner.

11. Page 25, second column, paragraph ending "...need special help."

Perhaps the most discredited—yet ineradicable—of all federal education programs is called "impact aid", whereby school districts affected by the presence of federal military bases and similar facilities are given special funding by Washington. This recommendation by the Subcouncil appears to create another such program, this time using the presence of immigrants as the basis for a new federal subsidy. It doesn't take much imagination to think of a dozen more pretexts whereby something that Uncle Sam does or doesn't do could as plausibly become a rationale for new federal aid schemes. But it's a ludicrous basis for policy making, especially in a time of tight resources.

12. Pages 26-27—brief section on families.

Extraordinarily precise when it comes to spending more tax dollars on sundry programs, including some with mixed (or unproven) results our Subcouncil sure wimps out when it comes to the delicate matter of decaying families and what to do about them. "Enforcing parental responsibilities" is arguably the most important notion introduced anywhere in this document, yet the Subcouncil declines to say anything concrete about how to do this. I detect a double standard at work, with specific due bills tendered when it comes to the public sector but only vague rhetoric when it comes to people taking responsibility for themselves and their children.

Thank you for the opportunity to serve on the Subcouncil.

Sincerely,

Chester E. Finn, Jr.

Albert Shanker
President
American Federation of Teachers
555 New Jersey Avenue, N.W.
Washington, D.C. 20001

Dear Al:

I wish to express concern about one aspect of the report of the Education Subcouncil report, namely page 20, second column, second bullet. This paragraph leaves to Congress the determination of whether there should be a state-level NAEP and whether the NAEP governing board's achievement levels should be supported in the future. I think this is a ridiculous comment on its face. "Congress" as a whole has shown very little interest in NAEP; a handful of members and their staff pay attention. Why should our Education Subcouncil, which presumably includes people who are knowledgeable, duck this issue and leave it to "Congress"? In my experience, the National Academy of Education reports on these matters have been extremely technical, leaving policy decisions to policymakers. I expect little from the GAO report, since it seems to be their custom to report what the interested members of Congress want to hear. That throws back onto our laps the necessity of reaching a judgment and not passing the buck.

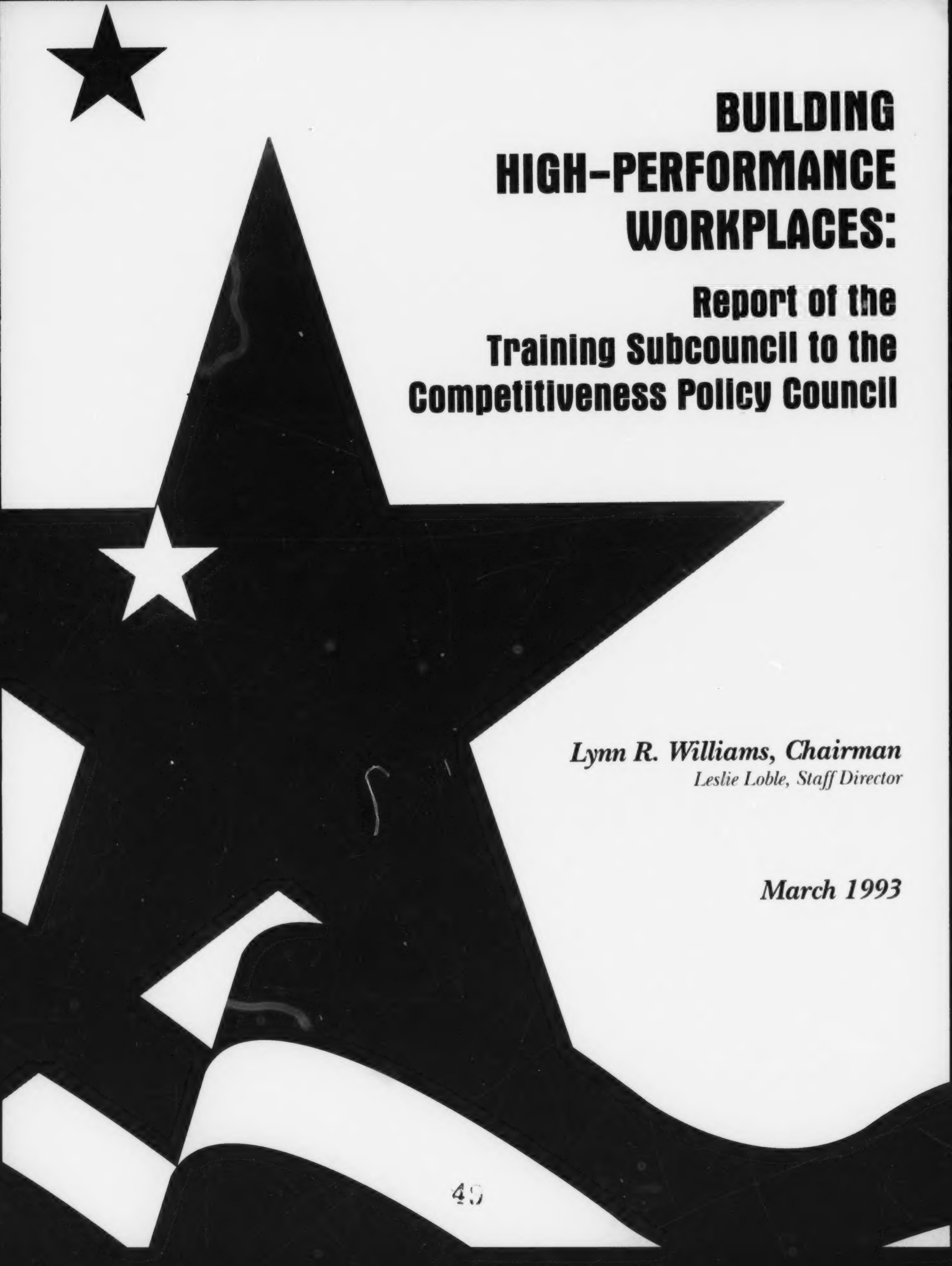
Why cannot we express our judgment about the value of NAEP's effort to set achievement levels? Based on what I know, I think that the achievement levels will make a vital contribution to the development of a good standards and assessment system. Of what value is it to parents or policymakers to learn that American 13-year-olds got an average of 270 on some test? Is that good or bad? What can we learn from that reporting method that will help us make improvements? I think it is far more useful to describe the percent of students who score "advanced," "proficient," "basic," and below basic. That helps educators understand what needs to be done and creates incentives for change.

Therefore, I strongly urge that the Education Subcouncil endorse NAGB's effort to develop achievement levels as the primary means of reporting tests results.

Thank you for the opportunity to serve on the Subcouncil.

Sincerely,

Diane Ravitch



BUILDING HIGH-PERFORMANCE WORKPLACES:

Report of the Training Subcouncil to the Competitiveness Policy Council

Lynn R. Williams, Chairman
Leslie Loble, Staff Director

March 1993

Training Subcouncil

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Ernest J. Savoie
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Audrey Theis
Assistant Secretary, Maryland Department of Economic Development

James Van Erden
Administrator, Office of Work-Based Learning, US Department of Labor

Harris Wofford
US Senate

COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

C. Fred Bergsten
Chairman, Competitiveness Policy Council
11 Dupont Circle
Washington, DC 20036

Dear Fred:

As this report from the Training Subcouncil makes clear, we can extend and promote America's economic vitality by investing in the skills of our workers to raise the performance of our firms. This will require real, effective partnerships between business, labor, and government, and a lasting commitment to economic well-being for all of our people.

In reaching these conclusions, the Subcouncil met three times to review a wide range of proposals. Our first session concentrated on existing employment and training efforts, and identified certain elements which we believed deserved reform. The second and third sessions focused on particular training issues such as school-to-work transition, training for incumbent employees, and adjustment programs for dislocated workers.

The Subcouncil's work benefitted enormously from a wide range of expert opinions and consultations. I want to particularly note the papers authored for the Subcouncil by Louis Jacobson, Richard Kazis, and Robert Sheets, as well as the dynamic, informative presentations of numerous outside authorities. My appreciation also to Leslie Loble, who wrote this report and managed the Subcouncil activities, and to Julie Kimmel who provided research assistance.

But perhaps the greatest contribution came from the Subcouncil members themselves. Together, they represent a wealth of expertise and knowledge. The breadth of their experience, understanding and commitment was the key ingredient in our successful effort.

This report, then, represents the broad consensus of opinions among Subcouncil members (though individuals may not ascribe to every provision). I strongly urge the

Competitiveness Policy Council to act upon these recommendations, and look forward to continuing to work with you in building America's competitiveness.

Sincerely,

Lynn R. Williams

Lynn R. Williams
Chairman, Training Subcouncil

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I. Introduction and Summary

The economic vitality of nations increasingly will turn on the skills, ingenuity, flexibility and performance of their workforces. While policies to encourage investment in new technology are important, they must be coupled with a skilled, flexible workforce to promote market share, productivity and wage gains.

The world's most competitive enterprises, those with peerless productivity and quality, have discovered that technology alone will not ensure competitiveness. Technology must be utilized by a workforce that gives "wisdom to the machine" — workers who have the kinds of skills that will allow powerful new technologies to be fully and effectively employed.

Moreover, they must operate in an environment that encourages continual improvement and advancement. What pulls technology and labor together into robust collaborations is the organization of the enterprise itself — the content of jobs, the design of the production process, and the relationships between people within the firm. These factors — technology, labor and work organization — are highly interactive and interdependent. Firms cannot design high performance work systems without the people and technology to power them. At the same time, new skills and cutting edge technology offer little advantage if they are not used.

Unfortunately, too many of America's workplaces still reflect turn-of-the-century production techniques. By some estimates, only five percent of our nation's businesses have replaced traditional production with high performance systems. We still break tasks into their smallest, most repetitive components and use status and bureaucracy to separate workers from management, or human resources departments from engineering. We reserve creativity and decision-making for specialists and managers. We replace workers with machines, and substitute foreign production for domestic. And we tend to emphasize cost over quality in addressing consumer demand.

Our nation's public policies and government programs can be equally hidebound by tradition. We divide our commerce and labor functions as if the two were not integrally linked. We reward processing of forms rather than effective performance. We fault our public servants rather than freeing them to attack problems creatively. We blame the victims rather than finding the resources to help them. And we draw a bright line between our public and private sectors, encouraging an adversarial, not cooperative, relationship.

Now we must change our course. Our economic strength depends on being able to compete in new and different ways. The world's high performing firms, including many in the US, achieve impressive levels of productivity and quality by breaking down the walls of tradition — investing in people as well as machines, opening up decision-making, rewarding and encouraging constant improvement. The world's most competitive nations gain economic power by enhancing and rewarding workforce performance — through coherent systems to promote lifelong learning, world class standards to encourage mastery, strong programs to ease the transition from school to work, and vital partnerships between public and private sectors and between management and labor. We have none of these.

We propose, then, an economic

strategy built upon a strong human resource policy, investing in the skills *and* work systems that command higher wages and promote greater productivity. The alternative — competition based on low wages — simply is unacceptable. Shrinking incomes only will exacerbate our already-painful income stratification and close the doors of opportunity for huge numbers of our people.

Our strategy is guided by certain basic principles:

- Policies which foster better skills for our workers and better work organizations for our firms are integrally linked. The design of our workplaces drives new skills and abilities, while better skills promote more dynamic, effective workplaces. We cannot address one without the other.
- We all — individuals, firms, unions and government — share responsibility for overcoming the challenges which face us. We all stand to gain.
- Our strategies should address the needs of both individuals and firms. Our labor policies historically have stressed individual needs, while our economic development plans have concentrated on firms. International competitiveness creates a new imperative: that we view both requirements in the same context.
- Unions, as the workers' own organizations, must be enlisted as full participants in developing, designing, and bringing about a new culture of workplace organization and human resource development.
- We must reinvigorate our public and private institutions to broaden their mission and enhance their accountability. We must create new partnerships between government, business, unions and workers that encourage a focus on mutual interests and long-term achievement.
- We must create an environment of constant improvement and lifelong learning. A volatile, ceaselessly changing international economy requires ongoing initiative and progress.
- Today's policies need not reflect old choices between government mandates or Adam Smith's invisible hand, or between public succor and private investment. Instead, they should strive for a synergy between government resources and private initiative.

Framed by these principles, this report proposes reform in four main areas.

First, we believe that we must build a better, more coordinated training system that responds to the needs of our students, workers and firms. Our present "system" is plagued by conflict, duplication and overlap. We have 125 different federal employment and training programs that rarely are coordinated with each other, let alone with programs to enhance the performance of our nation's workplaces. We talk of public-private partnerships yet have few effective mechanisms to ensure that our public training activities match private sector needs. Before we layer more programs onto a shaky structure, we must build a better foundation.

Second, incumbent workers need access to continual skills development, and to jobs that will utilize their abilities. A large segment of our existing labor force possesses inadequate skills for the expected growing demands of an international economy and too many of our firms have not organized themselves to use greater skills. Our challenge is not so much to enhance workers' skills for the jobs which exist today, but to address the scarcity of skills for the jobs which must exist tomorrow if we intend to retain economic vigor. This means encouraging both better training and new work practices.

Third, we must enhance the integration of school and work. Today we invest early in education and then leave students and firms to fend for themselves. The result? A third of our high school graduates flounder around in jobs without career prospects into their thirties, while our employers lament the lack of qualified young workers. Students need strong foundation skills and exposure to the realities of the modern workplace. It's time to build real incentives into our system for students, educators and employers to work harder at integrating learning and work.

Fourth, we must recognize that pressures on job security are greater today than ever before. Our economy is more dependent on international trade; the rate of technological change is accelerating; the end of the Cold War opens tremendous opportunities but also imposes some pain. Workers should not bear the full brunt of our steps toward economic progress; they should have real opportunities to participate in the benefits of change. And while the most important approach is to avoid dislocation (in part by implementing our first three recommendations), we must be prepared to support displaced workers generously.

Major Findings

(1) America's training needs are closely connected to reforming

A Case in Point

Concerned about global competitiveness, a mid-sized manufacturer in Maryland — Kop-Flex, Incorporated — decided in 1988 to modernize its plant. But after planning the investment of millions of dollars for new computer-controlled equipment, the firm quickly realized that the new technology alone could not produce the desired results. Maximizing return required far more than just new equipment, it demanded redesigning the production process itself and reinvesting in the workers' knowledge and skills.

In a bold move, the firm discarded old procedures in favor of cutting-edge systems. Gone was the traditional production process, where each employee had a very specific, circumscribed function, where products moved slowly through the plant, and where large inventories of supplies and parts accumulated to absorb fluctuations in demand. The new system relies on its ability to change over quickly, utilizing production cells with small groups of employees having the authority and flexibility to see a part from start to finish.

Working with its union, the plant put production workers through several training courses financed 50-50 by the firm and the State. Not only were workers required to learn how to operate the new equipment, but they also had to develop a wider range of skills to handle the multiple tasks now involved. Some workers, for example, today handle nearly every aspect of production, as they turn raw materials into completely finished products, boxed and ready for shipment.

This was a dramatic shift for many workers. The mechanical equipment which used to require manual skills now was driven by computers and demanded familiarity with software programming and statistical process control. A job once dominated by touch and feel had become conceptual.

Initially, some employees — both managerial and production — resist-ed the change. This was no tinkering at the edges, it was a rejection of years of tradition. For all they knew, it was just a sophisticated way to lay people off and make the rest work harder. But the company's commitment to training, and retraining if necessary, helped calm concerns.

In the end, the payoffs themselves took care of any residual doubt. Error rates have declined, and as a result quality is up and customer complaints are down. Production runs that once took ten weeks now take ten days. Employees receive higher wages to compensate for their broader skills and responsibilities. And when Kop-Flex looks to the future, it's confident it can compete effectively in a global economy.

the workplace itself; new work practices, proven to promote competitiveness, will shift authority, responsibility and skill requirements to front-line workers.

(2) We substantially underinvest in training and high performance workplaces, with the price extracted in lower productivity and declining standards of living.

(3) Effective training policies today require attention both to the needs of the disadvantaged and to lifelong learning opportunities for all workers.

(4) Our present employment and training system fails to address these comprehensive needs and wastes precious resources through duplication and overlap.

(5) Public and private resources will be more efficiently and effectively deployed if we build real partnerships between business, labor, and education.

Core Recommendations

- Build a network of local labor market boards, supported by state and federal coordinating bodies, to organize and oversee integrated workforce development strategies for the entire labor market. By consolidating programs, ending duplication and linking private sector leaders to public delivery systems, this structure will promote more efficient and effective use of public resources.
- Establish national occupational skill standards that will promote world class competencies and performance. Well-designed standards require a process led by private sector representatives.
- Encourage all firms to invest in the continual skills development of their workers. Options include a 1.5 percent of payroll training guarantee and targeted grants to firms and consortia.
- Increase access to lifelong learning opportunities for individuals by eliminating certain tax penalties and introducing a broad-based loan system.
- Provide incentives for companies to design and use work organizations that promote high quality and high productivity.
- Expand support for better integration of school and work, and disseminate promising innovations.
- Create an effective, meaningful worker adjustment program, backed by secure and adequate funding. Benefits must cover income support, training, access to health care and improved labor exchange services, among others. We should start with the best existing programs and expand them over time.

II. The Challenge and Opportunity

What's at Stake?

Over the last two decades, American real wages have declined for the first time in nearly half a century and, since 1979, the share of full-time workers earning poverty level wages has soared by more than 50 percent. Yet while nearly all wages now are declining, the drop has been far more precipitous for the bottom two-thirds of wage earners. As a consequence, we are witnessing widening income gaps; in fact, wage dispersion for American males is greater today than at any point since 1940.[1]

Employees without college degrees have borne the brunt of these trends. College educated workers earned 38 percent more than high school graduates in 1979 but by 1989, the college wage premium had grown to 55 percent. In fact, only college-educated workers have increased incomes since 1979, while everyone else's earnings have fallen.[2]

In short, we have created two wage tracks: high incomes and great opportunity for those able to get a good education and post-secondary degrees; low wages and limited opportunities for the 75 percent of high school students who will not graduate from college. There's an ever-widening gap between the so-called elites and "the rest."

There is nothing inevitable about this, however. Despite facing the same global pressures, and the same general economic trends, many of our competitors have boosted productivity growth rates, pushed up real wages for more of their workers, and experienced less severe income disparities. In fact, one of the hallmarks of their success has been the ability to widely distribute the gains of that progress, avoiding the deeply troubling income stratification that plagues our nation. In particular, real wages for workers in the bottom half of earnings have not dropped nearly as sharply as in the United States.

Part of the explanation can be found in the greater share of their economies devoted to industrial work — manufacturing supplies just over 17 percent of our jobs, compared to 31 percent for Germany and 24 percent for Japan.[3] Other factors include larger and stronger unions, higher official minimum wages, and more egalitarian wage structures.

But since some of these factors are undergoing similar changes abroad as here in the United States (e.g., a growing dependency on service jobs), another explanation may be in order. Increasingly, it appears that differing worker development strategies are a key ingredient in the recipe for higher productivity growth rates and better wages.

Competing economies invest substantially more in developing the skills of their workers — we spend 0.17 percent of our gross domestic product (GDP) on employment and training programs, while France spends four times that, for example. This disparity becomes especially significant when comparing commitments to those not pursuing university degrees. Two-thirds of the German workforce has completed an extensive apprenticeship program compared to less than two-tenths of one percent in the United States. Likewise, Japanese firms take secondary school graduates and put them through intensive training programs that are just the start of a lifetime of work-based learning.

In essence, our competitors see college educated and non-college graduates as much closer substitutes, which has permitted dramatic productivity gains and retention of high wage work. In both Germany and Japan the bottom two-thirds of the workforce has boosted productivity faster than has occurred in the US; in turn, this has justified rising wages.

An important piece of this story, however, is the interaction between improving workers skills and finding ways to effectively employ them. Competing economies not only do a much better job at preparing their citizens for work, but they also organize the work to get maximum return on their investment. To a great extent, they *had* to reorganize, lest the training investment become a costly waste. But in addition, these nations have offered policies to help firms make the transition to high performance work systems, coupling assistance in technology, work design, and information sharing with the investment in workforce development.

By any reasonable comparison, America invests a paltry proportion of our national economy in the training of our workers and the transformation of our workplaces. While there is no set optimal amount of education, training or technology, no absolute degree of investment which will guarantee American economic strength, it's nonetheless clear that our efforts are inadequate. The proof is in the falling standards of living imposed on growing numbers of our citizens. Meanwhile, our economic competitors have used their investment to boost productivity, raise wages and minimize the gap between rich and poor. Can we afford to fall further behind?

The Skills Gap?

There is growing evidence that the skills gap may have more to do with *potential* skill shortfalls than actual, existing deficits. Though there's no doubt that the skills of some American workers are inadequate for some American workplaces, higher skills simply may not become broadly necessary unless we pick up the pace of workplace transformation.

For example, knowledge-based occupations requiring technical and other skills will grow quite rapidly in the next ten years, but because they start from a smaller base, the bulk of American jobs still will involve low wage, low skill work in stores, offices and hospitals. The five most highly skilled occupational groups will provide only about 10 percent of new jobs by the year 2000, while low skill service occupations like food preparers, cleaners, and security guards will provide almost one quarter of all new jobs.[4]

The tempo of technology diffusion also would not indicate tremendous demand for new skills. The United States ranks 20th in per capita use of advanced machine tools, with countries like Bulgaria and Yugoslavia behind us, and Italy, South Korea, and Taiwan ahead.[5] Likewise, census and other surveys indicate that only one in ten installed machine tools is computer controlled (CNC), with heavy concentration in large plants and a few industries. Only about half of medium-sized plants and little more than a third of small plants have adopted this technology.[6]

Even when firms adopt sophisticated, modern technology, they tend to avoid reconfiguring the workplace along high performance principles that would require greater skill. One survey of large plants found they expect machine tool operators to monitor the CNC machines, for example, while white-collar engineers or technicians program them — despite the evidence that costs drop and productivity rises when operators have both functions.[7]

Similarly, a recent analysis for the National Institute for Standards and Technology (NIST) reports that the vast majority of America's smaller enterprises — 80 to 90 percent — have not reorganized work such that higher skills would be required.[8] And the Commission on the Skills of the American Workforce estimates that only five percent of US workplaces reflect high performance work organization.[9]

At the moment, then, we have weak and uneven demand for higher skilled workers, which, when combined with supply bottlenecks, creates a dual-faceted obstacle to American economic vitality. Our challenge is not so much to enhance workers' skills for the jobs which exist today, but to address the scarcity of skills for the jobs which must exist tomorrow if we intend to regain our competitive edge. Our strategies therefore need to be focused on both supply *and* demand — increasing opportunities for skill development and learning, as well as diffusing knowledge and development of high performance workplaces.

Supply Factors

Demographic Shifts — Employers will face quite different labor markets than those which have influenced corporate strategies for the last century. As the Baby Boom ages, the American labor force will grow much more slowly, there will be fewer workers available, and the labor force will be older and more diverse than historical patterns would suggest. These demographic changes will impose new requirements on our education and training systems. We will need to focus more than ever before on enhancing the skills of incumbent workers, and we will have to dramatically improve the education and training for new, young labor force entrants if we hope to compete effectively.

Weak Skills — Despite many pockets of educational excellence, we too often fail to educate our students well, especially when measured against the performance of our foreign competitors. Japanese, Korean and European students generally all score higher on math and science tests. Reading skills as well compare unfavorably, when 20 percent of our adults remain functionally illiterate (compared to only one percent of Japanese adults).

Without strong foundation skills, students have a tough time finding work, and employers find it difficult to keep pace with market demands. Only 150 of 8,000 entry-level job applicants were hired by Corning in West Virginia, after a half-day of interviews and rigorous basic skills testing.[10] Four in ten business executives say they cannot modernize their equipment because they think their workers could not handle it.[11] Only one in five firms believe high school graduates can write adequately, while more than two-thirds consider reading and arithmetic skills sub-standard.[12] In the end, the statistics translate into real constraints on productivity, wages and competitiveness.

Demand Factors

The principal pressure for better workforce development comes from the recognition that successful high wage international competition will require firms to organize their work in dramatically new ways, creating jobs that require new and different skills.

Economic competition throughout the bulk of the 20th century has relied on mass production methods, where lower prices are achieved by standardizing product lines to expand production runs and secure economies of scale. Jobs are narrowly defined to take advantage of a large pool of unskilled labor; technology is used to drive productivity increases. In this system, market choices tend to be determined more by producers than consumers.

Today, successful firms no longer compete just on price and cost, but increasingly differentiate themselves through quality and service. Firms win or lose in the marketplace by offering specialized, top quality products to an increasingly sophisticated and demanding consumer. A successful quality strategy depends on being able to produce to exacting standards, to quickly change product offerings and to reduce costs by producing smarter and better, not just more and cheaper. Japanese automakers can take a new automobile from concept to delivery in 40 months while Americans require five years, for example.[13]

Churning out the same product over and over again requires relatively little skill — equipment doesn't have to be retooled or reconfigured; designs needn't be reworked; marketing strategies don't have to be recreated. Now, firms and their employees must be able to adjust quickly and smoothly; and work has to be organized to facilitate not hamper flexibility.

These are high performance workplaces, where productivity and quality achieve world class levels. Though fairly widespread in Japanese enterprises, high performance workplaces can be found throughout America too. Two of the more widely acclaimed firms — Saturn and Motorola — offer compelling examples of the transformation. (See boxes on pages 58 and 59.)

What is High Performance Work Organization?

High performance systems revolve around a key central organizing principle: that human resource strategy is integrally linked with technology strategy. That is, policies to enhance workforce skills, security and pay; to improve flexibility; and to encourage continuous improvement are essential for the effective use of technology and the performance of the organization.

Several important qualities distinguish high performance from traditional mass production:

▶ The production process is stripped down to its most essential parts; all excess and disruptions are discarded because they add dollar costs, inefficiently use time and resources, and constrain feedback and flexibility. High performance production means less inventory, repair space, extra equipment, and other "buffers" which are essential to mass production.

▶ Even small disruptions can collapse the production process, because it eliminates all "fat" or "give," making it highly dependent on the abilities of those operating it. Delivery failures, equipment breakdowns and the like all must be dealt with — even anticipated if possible — by a skilled and competent workforce.

▶ Flexible, multi-purpose equipment is used to the maximum extent possible, permitting quick start-up

Traditional Work Organization	**High Performance Work Organization**
The company competes on high-volume production, emphasizing cost over quality.	The company competes on quality, faster cycle-times and the flexibility to meet individual customer specifications.
The production process is built around fixed automation, repetitive tasks performed by individual workers, and end-of-the-line quality control.	The production process depends on flexible automation, on-line quality control, and multi-skilled work groups.
A hierarchical structure separates employees from management and strictly defines the roles of each group.	The flatter organizational structure opens communication between workers and management.
Decisions are made by a centralized management and carried out through a hierarchical chain of command.	Authority is pushed towards front-line workers, who have the autonomy and authority to make decisions.
Technology is viewed as an isolated capital investment, and often is considered a replacement for skilled labor.	Technology and worker skills are integrated in order to make the most of each. Employees participate in the choice and application of new technology.
R&D staff have chief responsibilities for innovating the production process or redesigning products.	All employees participate in product and process improvements.
Occasional training is used to teach specific job-related skills or to introduce new machinery.	Continuous learning is part of a business strategy of ongoing improvement in quality and productivity.

and change overs depending on the product. Flexible equipment is programmable and usually computer-based.

- Workers have a major role in designing work procedures and methods, rather than waiting for management to tell them what to do. Front-line workers control equipment, even to the point of halting production to correct problems; this kind of authority and expertise is no longer reserved for technicians, specialists, or supervisors.
- Reciprocal commitment — from the firm to the worker and vice versa — is crucial because the focus must be on mutual and continual gains. Employment security, compensation based on skills and seniority, and minimization of status barriers between workers and managers promote mutual commitment.
- Success is achieved through a process of ongoing improvement. The goal is to enhance not depreciate the value of equipment over time, by improving its performance through human contributions — better problem-solving abilities, learning from mistakes, and the like.

These new systems radically change the human resource quotient. If implemented as envisioned, these systems push decision-making down to production line workers, broaden job responsibilities, and shorten production runs. The jobs require new and substantial skills: the ability to analyze information quickly, to anticipate and solve problems, to communicate clearly, to participate in decision-making, to work well in groups, and to handle a wide range of tasks efficiently and effectively. All of this requires substantial training.

Will the Investment Pay Off?

Transforming organizations into high performance workplaces, and enhancing worker skills to complement them, offer substantial return on the investment — higher productivity and better quality products for firms; better pay and employment security for workers; and the ability to continually adapt and remain competitive for both.

Early studies of workforce quality and learning found that educational attainment accounts for sizeable shares of economic growth. A seminal economic analysis found that as much as 60 percent of competitive improvements since 1929 can be attributed to advances in knowledge and education.[14]

Productivity

More recent studies have found a significant connection between training and productivity. A survey of 3,412 employers in 1982 found that an increase in training activities from 0 to 100 hours raised productivity by 13 to 15 percent.[15]

Today, some of the most persuasive evidence regarding the contribution by human resource development to modernization, productivity, and profitability derives from a series of cross national investigations of firms and plants in similar industries and with similar equipment. The results indicate the powerful interaction between technology, the structure of the organization, and the development of workers.

A three-year study of how firms introduce flexible manufacturing systems concluded that Japanese firms obtain quicker and greater productivity gains from new equipment and procedures compared to American enterprises. The Japanese plants implemented flexible manufacturing in one-half the time required for US firms, and once in place, they manufactured almost ten times the number of parts as their American counterparts.[16]

A crucial factor distinguishing the performance of these Japanese and American firms was the skill level and preparation of the workforce. Only eight percent of the American workers were engineers compared with 40 percent of the Japanese, and only 25 percent of the Americans were trained on CNC machines versus all of the Japanese workers. The conclusion? These new systems can succeed or fail on the basis of the workers who must operate them.[17]

Another study, of 70 automotive assembly plants across 17 countries in Asia, Europe and the United States, demonstrated that a substantial proportion of the variation in quality and productivity can be explained by human resource policy. Key factors included reduced status barriers between managers and production workers, ongoing training for production workers, greater employee involvement in problem-solving activity, and enhanced job design and responsibility through job rotation and work groups.

These factors not only were crucial for productivity improvement, but when quality as an outcome alone was considered, workforce-related changes were the *most* influential factors. Indeed, the amount of technology employed by the auto assemblers had relatively little effect on quality performance. It was only when the new technol-

Saturn

Last year, Saturn placed first in cars sold per dealer and beat out Honda Civic and Toyota Corolla in polls of buyer satisfaction. This year, *Business Week* identified Saturn as the highest quality American car. To produce a car capable of competing with foreign imports, Saturn relies on every employee from the front-line worker to the CEO to uphold strict standards of quality and efficiency. But what makes Saturn so different is that it has infused operations at every level with real, sustained power-sharing.

To a great extent, Saturn's power-sharing arrangement rests upon a new definition of labor-management relations between the United Auto Workers (UAW) and General Motors (GM). The union's primarily role has shifted from bargaining over wages and benefits to acting as a full partner in running the company, and management no longer tightly guards executive authority. For example, under "consensus guidelines" written into the "enterprise" contract, either labor or management may block a potential decision but must provide an alternative. The aim is to encourage creative, mutual problem-solving.

Similarly, representatives from both union and management sit on the Strategic Action Council, Saturn's top management group. The Council sets the long-range goals of Saturn, designs strategies for meeting those targets, and communicates with stockholders — matters typically reserved for high-level managers. The union also is heavily involved in the business end of the Saturn operation, with joint teams deciding marketing strategies and budgeting. The joint approach even governs matters like selecting advertising agencies and setting sticker prices.

Power-sharing guides the production process too. Each Saturn car is assembled by flexible, multi-skilled work teams which autonomously operate a work station. These units of six to 15 employees set production schedules, budget expenses, plan for quality goals, oversee hiring, and assign work schedules and vacation time. Team members also rotate job functions.

All of these changes means Saturn needs workers with substantial skills and flexibility. Accordingly, the company requires workers to spend at least 92 hours in training per year, about five percent of total work time. To cement the training focus, the company ties the last five percent of wages to meeting the training goal (which so far has easily been met). New employees get an even more intensive dose of training — their first week is 100 percent orientation, followed by two months of employment split between classroom and on-the-job training. As with Motorola and the other examples of high performance workplaces, Saturn produces impressive results, led by booming new car sales and customer satisfaction.

SOURCES: Barry Bluestone and Irving Bluestone, *Negotiating the Future* (New York: Basic Books, 1992); Beverly Geber, "Saturn's Grand Experiment," *Training*, June 1992; "Saturn," *Business Week*, August 17, 1992; "Here Comes GM's Saturn" *Business Week*, April 9, 1990; Ray Marshall, "The Future Role of Government in Industrial Relations," *Industrial Relations*, Winter 1992.

ogy was merged with human resource reforms that the firms achieved world class levels of production.[18]

Earnings

Training not only can improve performance by American companies, but can raise earnings and increase employment security for workers too.

A survey of literature on wage gains associated with skill enhancement concluded that company-based training programs can boost participants' wages by 10 to 30 percent.

Motorola

Motorola has set a remarkable goal for itself: perfection in every procedure, from soldering on the shop floor to filling out forms in the customer service department. Beginning five years ago, Motorola committed itself to achieving top quality production by the mid-1990s. Using what it calls *Six Sigma* quality criteria, the company aims for fewer than 3.4 defects per million opportunities in the production process. To meet these goals, the company restructured production around work groups, adopted "participative management" to involve employees directly in improving quality, and invested heavily in education and training. Among these changes, Motorola views education and training as the critical variable in guiding continuous improvement.

When Motorola first began to reorganize production around work groups responsible for improving and monitoring quality, it confronted an incumbent workforce that needed greater skills to handle broader responsibilities. According to vice president Bill Wiggenhorn, in 1987 fully two-thirds of the production workers in the Schaumberg, Illinois plant could not perform the autonomous problem-solving functions now required, in part because of weak reading and basic math skills. Therefore, to enable a shift to high performance, Motorola launched a massive training campaign, which at its height enrolled 40 percent of Motorola's US manufacturing and support workers in remedial education. In fact, some workers spent as many as 300 hours in training.

This initial push laid the foundation of worker skills upon which Motorola has built its strategy of continuous improvement. Today, Motorola treats continuous learning as the corollary of continuous quality improvement, and it has established an entire university to accommodate its ongoing training needs. Founded in 1990, Motorola University both designs individualized education packages for employees, and constructs training programs that are used company-wide.

Certainly, there's a great deal of demand for the university's courses — Motorola's departments invest between 2.4 percent and 2.8 percent of their budgets on training, and the company requires workers to spend 40 hours in training each year (some, like software engineers, take as many as 120 hours of training annually).

Since making a commitment to *Six Sigma* quality, Motorola has cut cycle time in half and reduced defects by 80 percent, saving about $962 million in inspection and rework costs. In the process, the company has changed its corporate culture. On the one hand, ambitious goal-setting and aggressive measurement provide the methods and incentives to improve product quality. On the other hand, continuous learning, when applied in a flexible, team-based work structure, enables workers to improve the process. Motorola already has achieved a tenfold improvement in quality and is narrowing the margin in its quest to achieve *Six Sigma* quality.

SOURCES: Steve Helig, "Teaching for Quality," *Quality*, July/August 1992; US Congress, Office of Technology Assistance, *Worker Training: Competing in the New International Economy* (Washington, D.C.: US Government Printing Office, 1990); Brian S. Meskel. "Just A Degree of Confidence." *Industry Week*, February 19, 1990; Daniel V. Hunt. *Quality in America: How To Implement a Competitive Quality Program* (Homewood, IL: Business One Irwin, 1992); Motorola, Inc., *Annual Report 1991*.

Moreover, this earnings edge will last up to 13 or 14 years.[19] Another examination revealed that young male adults employed in "high learning" jobs in 1979 had raised their wages by as much as 14 percent three years later.[20] Finally, high performance workplaces, which by their very nature involve more and continuous skill improvement, tend to pay higher wages and promote employment security, especially as they permit companies and employees to respond affirmatively to economic changes.

III. Recommendations

High performance workplaces create a fortunate confluence of results — the very same characteristics which help companies become more viable also enhance worker welfare. The systems and organizational structures which promote productivity and quality at the same time make jobs more dynamic and meaningful and lead to better employment security and higher wages.

Beyond the direct, financial benefits for firms and their employees, these systems potentially open up a world of new opportunities. Imagine workplaces where management and labor share the same vision and mutual respect, for example.

The development and diffusion of these modern work systems therefore must become a key focus of our nation's economic strategy. We propose a four-part approach: one, build a better training system; two, promote continual skills development; three, enhance the integration of school and work; and four, ease the adjustment process associated with dislocation.

Strategy One: Build a Training System that Works

Unlike our most robust industrial competitors, the United States lacks a coherent system for training and lifelong learning. Instead, we offer our workers, youth and firms a confusing array of public programs, riddled with duplication and overlap, that too often leaves people and companies no better off than when they started.

For example, no central "intake" center helps potential training customers — whether workers, students or firms — seek information on jobs or skills, or get help negotiating the thickets of public and private training and economic development programs. Precious little effort is devoted to connecting public delivery systems with private sector needs. Links between our activities in basic education, vocational training and economic development are limited.

And certainly, no consistent effort exists to evaluate *results*. Are we helping enhance employment security and standards of living with all these education and training dollars? Do students and trainees actually get and/or retain good jobs? Do firms find the quality workers they seek? Or are we wasting money and raising false hopes?

Moreover, our chaotic system continues to focus on a welter of second chance training programs for the poor and disadvantaged. As crucial as these are, today's economy also demands that *all* workers have access to *ongoing* skills and learning opportunities. Our present system, designed as it was to fill gaps, has virtually no capacity to handle such comprehensive workforce development needs.

Finally, we fail to link our public programs to private sector requirements; as a result, our activities can end up poorly designed, badly executed and inadequately accountable. Without effective input from business and labor — the people who really know what is happening in workplaces and labor markets — our "system" will not help us become more competitive.

When it comes to America's network of employment and training programs, then, not only are we failing to serve people and businesses well, but we also lack the right

Overlapping Federal Services

Targeted Group	Counseling & Assessment	Remedial/ Basic Skills Training	Classroom Occupational Training	On-the-Job Training	Job Search Training	Job Placement	Job Creation
Economically Disadvantaged	40	34	37	23	26	29	27
Youth: Persons Under 22 Years	37	36	27	17	17	23	6
Physical or Mental Disabilities	29	21	21	16	16	22	7
Educationally Disadvantaged	18	22	9	5	5	8	4
Unemployed or Dislocated Workers	20	12	18	13	14	15	18
Veterans	15	11	8	7	7	9	4
Ethnic/Racial Groups and Women	18	8	14	10	8	13	8
Migrant or Seasonal Workers	8	9	5	3	4	6	3
Older Workers	9	7	8	6	8	8	5

SOURCE: US General Accounting Office, Multiple Employment Programs *(Washington, DC: US Government Printing Office, July 1992).*

vision, focus and structure to permit economic prosperity in a changing world. Before we layer more programs onto a shaky structure, we must rehabilitate the foundation.

The Current US Training "System"

Spread across 14 agencies, 125 federal programs provide employment and training services for adults and out of school youth, according to a recent analysis by the US General Accounting Office. Many of these programs serve the same client groups; for example, 65 programs aim to address the second chance training needs of the disadvantaged; 48 programs focus on youth; ten programs target older workers; and no less than 20 programs offer counseling for displaced employees. At the same time, many programs offer similar services — nearly 90 programs offer counseling and assessment; some 75 provide occupational training; and about 50 programs engage in job placement.[21]

Compounding the confusion, these activities generally operate without any uniform definitions or requirements. For instance, a participant's level of income or welfare status may determine their eligibility for some programs serving the disadvantaged, while ability to pay or residency in depressed areas serve as qualifying criteria for others. Taken together, these differing programs and conditions create administrative nightmares, bureaucratic waste, and access barriers for potential beneficiaries.

Foreign Systems That Work

By contrast, many of our leading economic competitors have constructed easily accessible, user-friendly employment and training systems which promote lifelong learning and help businesses remain competitive.

▶ *Canada* concentrates on three main clients: workers, companies and communities. Labor market programs are organized around these client groups, and administered through local "one stop shopping" entities.

▶ *Singapore* has built impressive economic growth rates on a commitment to improve workforce skills. Part of this effort relies on a network of training institutes, some of which offer general factory skills while others concentrate on more specific job categories.

▶ *Great Britain* recently established a national public-private system of localized Training and Enterprise Councils which both administer public programs and work with the private sector to promote skill development.

▶ *Japan* combines employer and government funds to finance a national Human Resources Development Bureau and nearly 400 vocational training centers. These facilities work with firms both to design in-house training programs and to develop industry skill standards.

New State Systems

Many of America's 50 states have struggled to get some control over the plethora of employment and training programs, generally by establishing high level coordinating bodies as part of state-wide plans to boost workforce development. These state councils typically oversee planning and goal-setting, and forge links between related education, training and economic development activities. New Jersey and Oregon offer two examples of this reform movement.

▶ *New Jersey.* Created in 1990, New Jersey's 34-member Employment and Training Commission recently proposed substantial revision of the state's workforce development programs. Instead of spreading 64 programs across six state agencies, henceforth responsibilities will shift to three core agencies — education, higher education and labor — while others, like commerce, economic development and human services (and their clients), will become "consumers." The state's unified workforce readiness plan, developed by the Commission according to explicit, agreed-upon goals, will guide and direct all employment and training programs. Commission members representing government, business, labor and the public see the plan as a living document which can be revised whenever changes in labor market conditions, new state priorities or evaluations of program effectiveness dictate.

▶ *Oregon.* Last year Oregon created the Workforce Quality Council following a massive, state-wide examination of economic, environmental and social well-being. After uncovering disappointing levels of educational and economic achievement, the Oregon Progress Board developed 73 specific targets to direct and measure the state's progress in human development. According to a 20-year strategic plan, by the year 2000 the state aims to have the "best educated and trained people in America." What distinguishes Oregon's efforts is its clear attempt to establish accountability to the plan via measurable benchmarks: for example, by 2000, employers are targeted to dedicate 2.5 percent of payroll to training, and 70 percent of adults are expected to have at least one year of post-secondary education. Oregon gave the State Workforce Quality Council the authority to pull the system together and make sure the workforce goals are met. As in New Jersey, the council is designed to attract many perspectives, including public economic development, education and labor agencies; private sector representatives of companies and workers; and citizens.

Similar efforts to better design and implement workforce development strategies can be found in Maine and Washington; Pennsylvania and New York; Massachusetts, Wisconsin, California, and many other states across America.

A Better System for the Future

It's time we pulled the experience from competing nations and experimenting states into a consistent framework that addresses all of America's workforce needs. To start with, any national workforce development system must be guided by certain basic principles; it must:

- help America's businesses and workers reach world class performance levels;
- bring together key stakeholders — including firms, unions, citizens, educators and public agencies — to design goals and strategies;
- focus on serving customer needs, not bureaucratic mandates;
- provide comprehensive services with maximum flexibility and minimum bureaucracy;
- tie funding to performance through standards that will drive better quality services and more accountable providers; and
- evaluate policies and programs to ensure they achieve stated missions.

Meeting these goals will require two major systemic reforms: first, improving the governance of public programs; and second, designing skill standards. Our proposals are organized under these two headings.

A. Improving Governance

Recommendation:

Build a network of local labor market boards, supported by state and federal coordinating bodies, to organize and oversee integrated workforce development strategies for the entire labor market. By consolidating programs, ending duplication and linking private sector leaders to public delivery systems, this structure will promote more efficient and effective use of resources.

Local Labor Market Boards

Our economy is less one large entity than a collection of local labor markets. When it comes to human resource concerns, firms and workers generally orient themselves to the surrounding community. Companies normally seek to hire nearby talent rather than recruit nationwide, and employees usually prefer to stay in one area than move. At the same time, education and training institutions tend to focus on local issues and concerns. More productive workforce development strategies therefore should center on the natural locus of labor market activity.

Today, we have no effective means to help firms and workers negotiate their local labor markets. The present Employment Service (ES) typically aids workers with marginal skills and employers with low skill, low wage jobs. The Private Industry Councils (PICs) established under the Job Training Partnership Act also serve only a limited group of workers and firms. Neither the ES nor the PICs *currently* are equipped to handle the growing workforce development demands of our modern economy, though both potentially could.

We believe, therefore, that one important step this nation can take toward improving worker skills and fostering high performance work organizations is to develop a network of boards that will guide effective employment and training strategies for the *entire* local labor market, not just the margins. These boards will differ from existing local agencies by providing broader services to a larger group of customers, by possessing greater authority, and by actively promoting workplace strategies to build economic well-being. Among their responsibilities will be to:

- *Oversee an efficient, integrated service delivery system* so that students, employees, and firms can get the full range of employment and training services they need — including skills assessment, career counseling, job placement, recruitment and referral assistance, and help in introducing high performance workplaces. The boards must ensure seamless, comprehensive "one-stop" services where the customer's needs come first — not bureaucratic mandates or institutional barriers.

▶ *Connect and convene key elements of the labor market* — employers, unions, schools, vocational training centers, and private service providers, among others. For instance, the local board should bring firms, unions, and schools together to better integrate school and work. It also should encourage firms and unions to form training consortia, and help match training providers with these consortia, since such groups help overcome many of the obstacles to better training and workplace modernization.

▶ *Manage top-quality labor market information systems* which offer accurate, reliable data on the quality and costs of local training services; on expected demand for people and skills; and on local job placements and openings.

▶ *Promote high performance workplaces* by energizing and assisting local employers and unions in making the transformation.

▶ *Guide local policies and program priorities* by linking private sector leaders with public service providers.

These local boards should be comprised of respected business, labor and community leaders, along with key economic development, education and training officials. In addition, they must have adequate fiscal and staff resources to ensure superior services, and possess clear authority for quality control (e.g., the ability to certify training providers). Finally, they should report annually to the state coordinating councils on their progress toward achieving national and state workforce development goals.

State Coordinating Councils

Building on the successful state initiatives that pull together education, training, and economic development activities, the federal government should require states to establish state-wide coordinating councils as a condition for receiving federal training, education, and economic development funds. Certain guidelines, rather than a single "correct" design, should shape these state coordination efforts. First, council membership should reflect key stakeholders. Second, the councils should spell out state-wide goals and strategies for boosting workforce development, consistent with national plans. Third, they should devise strong incentives, based on performance, for state agencies to effectively work together, to streamline programs, and to produce results for clients. Fourth, they should oversee the local labor market boards. Fifth, they should report annually to the national workforce development board (see below).

Just as in local labor markets, some administrative bodies already exist at the state level that might form the basis for coordinating councils. We believe the state can best decide which of these, if any, will work. More importantly, each state must guarantee that the function and authority of its coordinating council will cut across programmatic jurisdictions (like education, training, and economic development) and will streamline administration, not add to the confusion.

Some critics of coordinating councils suggest that there's just so much any state can do, as long as the federal decision-makers keep creating bureaucratic firewalls. Recognizing some validity to that argument, we will next propose a national board with authority to reduce administrative tangles. Nonetheless, because nearly every federal program now devolves substantial decision-making and administrative authority to the state, today's governors possess enormous power to better coordinate workforce development activities (and the New Jersey and Oregon councils demonstrate this broad authority). State-wide councils can help focus that power to yield targeted human — and industrial — development gains.

National Workforce Development Board

With no single locus for federal workforce development issues — 14 agencies and countless sub-offices push different policies and programs — our efforts to enhance competitiveness end up very ad hoc and even contradictory, rather than strategic and focused. By contrast, our chief international competitors, including Japan, Singapore and Germany, employ national bodies to set goals, outline specific strategies, oversee the workforce development system and, importantly, ensure that private sector requirements drive training goals and strategies not vice versa. It's time we did the same.

Accordingly, we propose the creation of a National Workforce Development Board to design broad labor market policy and recommend annually to the President and the Congress national goals and tactics for implementing that policy. The National Workforce Development Board would:

- *Articulate goals* for national productivity, skill development and diffusion of high performance work systems.
- *Recommend strategies* for ensuring our public workforce development system achieves the proposed targets and meets the needs of three main clients: workers, firms, and communities.
- *Coordinate federal employment, training, education and modernization programs*; and create a coherent system of lifelong learning and workplace improvement.
- *Guide a national skill standards development process.*
- *Oversee evaluations* of public programs to monitor their efficacy and enhance our ability to learn from experience.

To effectively meet these responsibilities, board membership should involve participants who know from experience and expertise what can and should be done. We envision a board comprised of leading business and labor representatives; representatives of the Governors and educational institutions; and the Secretaries of Labor, Education, Commerce and Defense (key agencies responsible for skill development and workplace reforms).

With such a large task, the Development Board must set near-term priorities. Among its top priorities, and *within one year*, the board should submit recommendations to:

- *Consolidate the present workforce development system* with specific recommendations for eliminating duplication among our 125 federal employment and training programs. This consolidation should free resources for use where they are needed most — delivering services to customers and making sure our programs are working.
- *Set performance benchmarks* for federal programs that will measure and promote competitiveness-related outcomes. For example, these benchmarks might include diffusion of high performance work systems, employment levels, productivity growth rates, standards of living, and wage rates, among other measures.
- *Standardize key program terminology* by establishing uniform eligibility criteria and/or other steps.

Most of the board's functions can and should be handled by existing departments and agencies. In fact, some activities should be merged to cut bureaucratic overlap — e.g., there would be no need for a separate, research-oriented National Commission on Employment Policy as those functions would be handled by the broader National Workforce Development Board.

B. Designing Occupational Skill Standards

Recommendation:

Establish national occupational skill standards that will promote world class competencies and performance. Well-designed standards require a process led by private sector representatives.

What Are Skill Standards?

America's labor markets are plagued by a lack of useful information and accountability. Students entering the labor force, as well as employees already working, rarely get accurate information on the skill requirements of firms or the competencies required to compete effectively for top wage jobs. Companies hire new graduates only reluctantly because they don't know or trust existing academic or training credentials. Unions, fully aware that training is a key to their members' employment security, cannot effectively determine what skills are needed. And no one knows for sure whether training providers will meet top quality standards. All of these problems are exacerbated by America's relatively high labor mobility.

Now imagine a different world — one where students and workers can maximize high wage job access and employment security, firms can maximize flexibility, and both can know they are getting useful, relevant and marketable skills.

In the bridge between these two worlds — the new training system we propose here — occupational skill standards form one of the spans. Skill standards are the requirements for high quality knowledge, skill and ability within an occupation or industry — in short, what you need to know to perform at top levels. For example, skill standards for general production workers in metalworking fields might require demonstrated proficiency in job planning and management; equipment operation; quality control; and safety protection, among other areas. Mastery of skills usually results in certification.

The Benefits of Skill Standards

Nationwide, industry-based skill standards can provide a solid foundation for a national training system. Among other advantages, standards:

- *Set goals for skill achievement, competency and performance* that can drive American competitiveness.
- *Allow employers to make more objective employment decisions* and remain confident that workers possess needed skills.
- *Assure workers that they are trained at world class levels* and possess marketable abilities, facilitating labor market entry, career advancement, or transitions between jobs.
- *Help unions increase their members' lifelong employment security* and access to higher wage jobs.
- *Guide the curricula and quality of training programs.*
- *Promote the training of more general skills* rather than narrow firm or equipment specific abilities.
- *Improve the accountability* of public and private training programs by providing measurable standards for evaluation.
- *Permit service delivery innovation and diversity* without sacrificing quality or micro-managing providers through regulation.

Standards At Work

Germany offers a powerful example of how standards can enhance training systems and skill achievement. The intensive German apprenticeship program provides students with three to four years of education, training, and work experience within one of some 400 occupations. Demanding and precise curricula, based on rigorous skill standards and designed through a consensus-building process involving employers, unions, public officials, and training experts, form the heart of the German system. Beginning with solid foundation skills, apprentices move through progressively higher and more specialized competencies, culminating in certification within a specialty. The power of this certification is so strong that nearly one out of every five students qualified to enter college prefers to enroll in the apprenticeship program because employers highly value the dual theoretical and practical education it provides.[22]

The Limits of Standards

Despite clear examples of success, we recognize standards have their limitations. If not carefully designed, they can end up excluding people from entering occupations. Without private sector leadership to develop them and keep them current, standards can become weak, outmoded and irrelevant. Some also fear poorly predicated standards will be too interventionist, forcing firms to make inappropriate changes or undermining the authority of management or unions. Finally, standards must be both broad enough to permit flexibility in a constantly changing economy, yet narrow enough to have currency in that occupational job market — and this is a tough line to walk. In short, establishing the right process for designing and maintaining standards is absolutely crucial for their successful deployment.

The Movement Toward Standards

Though the United States remains the only industrialized nation without a formal system for developing and disseminating skill standards, a powerful, broad-based movement has developed in support of such systems. For example, business, union, and educational leaders in the US are moving rapidly toward establishing world-class standards for school performance and they have created ongoing mechanisms for devising educational goals, curricula, and assessments. These efforts, as new and important as they are, join a rich tradition of skill standards and teaching systems already adopted by unions and employers. Labor unions, especially in craft or skilled trade occupations, long have set and certified competencies, often as part of formal apprenticeship programs. Some employer associations, covering the machining, banking, hospitality and other industries, likewise have offered detailed training curricula for their members.[23]

A Standard-Setting Process

Although we remain cautious about the feasibility of designing standards, and recognize they cannot cover the entire economy or every occupation, we believe we must broaden existing efforts to create a process that will promote the right kinds of occupational skill standards, and the learning curricula to assure them. This process, and the standards themselves, must meet certain core tests for viability.

First, skill standards must be jointly designed by representatives of business, labor, and educational institutions with recognized expertise and experience within the industry.

Second, skill standards must be benchmarked to international best practice levels, and developments among leading US and foreign firms carefully tracked.

Third, skill standards should drive curricula which begin with core basic competencies applicable across all workplaces and then move to progressively higher, and more specific, skill levels within particular occupations.

Fourth, skill standards must be broad enough to permit flexible responses to changing economic conditions, but narrow enough to provide workers and employers with measurable, recognizable competencies within particular fields.

Fifth, skill standards must be free from bias and discrimination.

Beyond these key elements, we suggest certain specific steps to get the standard-setting process in motion:

- ▶ *Create an accessible national skill standards database* based on a survey of employers about skill requirements, as well as other expertise from education and training professionals, existing apprenticeship programs and experience with national standards abroad.
- ▶ *Establish a set of nationally-recognized associate degrees* for manufacturing, finance, communications, and other key sectors. The degrees would guarantee a graduate's achievement of core competencies for high performance work and a series of electives within a chosen specialization. Courses must be designed to produce world class competency levels.
- ▶ *Create a market for standards* by incorporating them over time as part of federal training programs. The initial effort, focused on school-to-work activities and entry-level occupations, would shadow existing basic education standards-setting efforts. As soon as practicable, however, standards should become a core part of the labor market information systems utilized by local labor market boards, as well as training programs for disadvantaged, dislocated or employed workers.
- ▶ *Establish a skill standards committee*, under the auspices of the National Workforce Development Board, to administer the standards-setting process. The Board may elect to fill the committee with Board members, though expertise in industry skill requirements should be considered. Within its first year, the committee should establish permanent procedures for designing standards and training curricula that meet the tests outlined above and fulfill these first steps.[24]

Strategy Two: Promote Continual Skills Development

Federal training investments traditionally have been focussed on those individuals who face impediments to employment. This principally has meant spending for a wide array of second chance education and training programs for disadvantaged citizens. We also have devoted resources to the retraining of displaced workers, and others affected by specific events or developments.

These remain extremely important priorities. Yet now some potentially dramatic changes in the nature of our economy, and the labor market in particular, have raised new concerns about workforce development.

First, the rapid growth of international competition has placed tremendous pressure on American companies to transform their workplaces into higher performing systems which will require more highly skilled workers. While some of the talents can be supplied by hiring new employees, generally the skills can and should be promoted among workers already employed by the firm. These "internal" investments not only will bring important returns like productivity and profitability, but also intangible benefits like increased loyalty and commitment to corporate goals. If nothing else, however, demographic changes will force attention to the need for developing incumbent workers; simply put, the labor market will shrink as Baby Boomers age and new entrants decrease.

A second factor — the growing volatility of our economy — highlights the need for greater investment in the skills of incumbent workers. Companies and employees no longer just face threats from cyclical economic factors, but also from huge, structural shifts like conversion to a civilian economy, clean air rules, and adoption (potentially) of trade pacts like the North American Free Trade Agreement (NAFTA). Accordingly, some say people will have as many as seven jobs in a lifetime. Even at half this rate, it's clear that workers need to pursue strategies which will enhance lifetime employment security, if not actual job security — and that means transferable, recognizable, and valuable skills.

In short, there's a fortunate merger of interests in the demand for enhanced competitiveness. Firms need workers with more skills, especially those which promote flexibility, while employees need skills that will enhance their survival in an ever-tougher labor market. To a great extent, these skills are one and the same. Moreover, the same strategies which will promote corporate competitiveness — designing high performance workplaces — will boost worker welfare. As a result, the focus of human resource policies has shifted away from solely supporting the needs of individuals and toward strategies that are firm-based and competitiveness focussed.

Present Private Investment Levels

American companies devote substantial dollars to workforce development, about $30 billion annually for formal training, and perhaps as much as $180 billion for informal, on-the-job training.[25] Among some unionized enterprises, such as those in the auto, steel, and communications industries, special training funds have grown quite large through negotiated contributions (e.g., the auto industry sets aside 19 cents per hour).

Workplaces organized around high performance principles systematically provide tremendous amounts of training. First, they require workers with substantial skills both to operate sophisticated equipment and to handle more broadly-defined, multi-task jobs. Not surprisingly, then, high performance firms spend a lot for formal training (e.g., Saturn aims for each employee to spend five percent of working hours in training, on top of 300 hours of start-up instruction).[26] Second, and perhaps more importantly, these work systems are designed expressly for *constant* learning and improvement, through job rotation, work teams, problem solving and other mechanisms which "force" ongoing skill enhancement. These learning systems, crucial as they are, may not appear as formal training expenditures.

Recent data indicate some expanding commitment to workforce development. The latest Department of Labor survey of training among employed adults reveals that employers may be spending more. Some 41 percent of workers reported in 1991 having ever received skill upgrade training, compared to 35 percent in the 1982 survey.[27]

Uneven Distribution

While many American companies of all sizes devote large portions of their corporate budgets to training and workforce development, it's far from the majority. Averaged across the economy, US firms spend slightly more than one percent of payroll on training, as compared to as much as six percent of payroll in competing economies.[28] Importantly, most of this investment is concentrated among a handful of firms — one-half of one percent of all employers spend 90 percent of the formal training dollars.[29]

Training contributions by firms can be spotty — most employees get training in school before they start working or informally through the work itself and "following Joe around." Certainly, the expenditures are rather inequitably distributed. Two-thirds of the corporate training dollar goes to management, while front-line workers get only eight cents.[30] Whites get the bulk of all private training and, in fact, are the only group whose share of training dollars exceeds its proportion of the workforce. Both younger and older workers also lose out on training opportunities, compared to those between ages 25 and 45.[31]

On the public side, we don't do much at the national level to help firms overcome obstacles to investing more in high performance systems and training. The main federal training program, JTPA or Job Training Partnership Act, serves very few employers (only nine percent according to a Bureau of National Affairs survey).[32] The key technology assistance programs get little funding and, until very recently, virtually ignored work organization and training. A few recently created company-focused programs such as workplace literacy have produced inconclusive results.

Similarly, we pretty much leave individual workers on their own even as we call upon them to care more about their skill development. Tax deductible educational expenses must be job-related, for instance, which can prevent front-line workers, in traditional, narrowly-defined jobs, from obtaining new skills. The breadth and diversity of community college offerings, however, do offer a bright light.

State Efforts to Fill The Gap

Fortunately, the nation's states have engaged in substantial experimentation; 44 states in 1989 spent nearly $500 million on customized training programs, industrial extension services, and modernization programs which support firms seeking higher performance. Two of the more successful endeavors are California's Employment Training Panel (ETP) and Illinois' Prairie State 2000.

▶ As the nation's largest customized training program, ETP invested $300 million in 1,200 training contracts covering nearly 200,000 trainees between 1983 and 1991. Participating firms must certify that employees are likely to be displaced and must devise plans to ensure the training will aid the worker's long-term employment security. Performance standards require that workers retain new jobs for at least 90 days, which has produced dramatic success rates, but critics charge this has encouraged "cream-skimming" and substitution (public dollars going to firms who would have made the investment anyway). ETP is financed by a 0.1 percent payroll tax.

▶ At the other end of the spectrum, the tiny, $7 million, six-staff Prairie State 2000 has compiled an impressive record. An outgrowth of traditional smokestack chasing programs, Prairie State 2000 has helped 1,200 firms and 68,000 workers improve skills and performance through grants and loans split 50-50 between the state and the company. Firms design their own plans, but Prairie

State imposes performance standards relating to employment, productivity, wage rates and other competitiveness factors.

Small Firms and A Special Case

By and large these state customized training and modernization programs serve small and medium sized companies, which tend to have the greatest need for assistance. The disparity between training in large and small firms, for example, is particularly disturbing given the contribution of small and medium sized businesses (SMEs) to employment and the economy.

These smaller companies typically end up with lesser skilled workers since they cannot compete with the wages, benefits, and internal promotion ladders offered by big firms. These days, they face a tough Catch 22 (especially those which operate as suppliers to large manufacturers). On the one hand, their customers are demanding vast improvements in quality, speed, and productivity, even threatening to terminate contracts if standards are not met. On the other hand, they face real obstacles to improving their performance: inadequate funds for investment in technology or training; inability to easily access the external labor market; and lack of information about what resources are available, among other impediments.

These generalities, of course, hide some important exceptions. Take Will-Burt, a small parts supplier to Volvo Truck, Caterpillar, and Ford. In 1985, this small company had big problems: razor-thin profit margins; high defect rates; hostile labor-management relations; low employee morale; and workers' with low skills.

That year, though, the company embarked on the road to high performance, setting goals of flawless quality and perfect on-time delivery. The key, according to Will-Burt's then-new president, was worker education. Accordingly, he required every worker to take a blueprint reading course, and introduced a continual improvement system. Workers would take tests administered by outside examiners and move to progressively harder courses, with the aim of introducing important modern factory techniques like statistical process control and creating a living "databank".

Seven years later, Will-Burt spends 15 percent of payroll on training; production workers even can enroll in a company-sponsored "mini-MBA" program. The company boasts a 98 percent on-time delivery rate; parts rejection of less than one percent; and 100 percent math literacy. Morale and wages are up; sick days, workers compensation payments, and turnover are down.[33]

More Public Support for Private Effort

If we want to boost our economic well-being through higher performing workplaces, then we must invest more in the development of our employees. Charting a new course will demand shared commitment from workers, their employers and unions, and the public. It will not come cheap, though the rewards will be worthwhile. It will require incentives for firms and workers to invest more in learning and training. It will mean linking these incentives to helping firms move from traditional work systems to high performance enterprises. And it will have to address historical maldistribution of resources; the front-line worker, an ever-more important contributor to workplace productivity, must not be ignored.

Our recommendations for enhancing continuous learning are divided into three main areas: (a) encouraging greater training investment by firms; (b) helping individuals gain access to skill upgrading; and (c) diffusing high performance workplaces.

A. Investing By Companies

Recommendation:

Encourage all firms to build high performance workplaces by investing in the continual skills development of their workers.

Many obstacles prevent firms, especially small and medium sized enterprises, from investing greater shares of payroll in the development of their workers including:

- *skepticism about the benefits* of training;
- *concern about turnover* and loss of investment as the employee walks out the door;
- *lack of information* about the availability and quality of training providers;
- *preference for alternatives* to training (e.g., hiring from external labor markets and substituting capital for labor);
- *fear of losing "control"* as authority and decision-making get pushed down the line in transformed workplaces; and
- *anxiety over cost*, lost work time and the inability to achieve economies of scale with small work groups.[34]

To help defray training costs, federal tax rules at present permit companies to deduct expenses. However, this fails to address many of the investment impediments or to help firms whose thin operating margins eliminate any potential training outlays.

Accordingly, we believe additional steps must be taken and two options top our list:

(1) Instituting a training guarantee which would require firms with at least 50 workers to invest 1.5 percent of payroll in developing the skills of their employees, or pay the equivalent into a national training fund.

(2) Creating a program of training grants for firms, unions and consortia, coordinated with existing state modernization and customized training programs and financed through general revenues or a very small payroll tax.

Training Guarantee

A number of industrial nations have adopted laws that require corporations to invest in their employees' skill development. The longest extant program, France's training levy, has imposed a mandatory minimum training expenditure since 1971. Today, French firms must allocate 1.7 percent of payroll, a half percent of which is devoted to apprenticeship training, or pay the equivalent into a national training fund.

We believe a similar guarantee could be enacted; specifically, that firms directly invest 1.5 percent of payroll in training or contribute the same to a national skill development account. Smaller companies, with fewer than 50 employees, would be exempt; and employers could average expenditures across three years. Training dollars should be allocated to front-line workers generally in proportion to their share of the workforce. Joint committees should design training activities.

American companies on average already spend more than one percent of payroll on workforce development, though the bulk of this is allocated by just a handful of firms. A training guarantee would send a clear and powerful signal that we need all firms to make training commitments.

Training guarantees offer a number of advantages. By requiring firms to make the investment themselves, a training minimum ensures that the private sector, not government, designs and implements training strategies appropriate and relevant to the firm. The universality of the program eliminates one of the most frequently cited barriers to training: the fear that other firms will poach trained workers, reaping the benefit of another's investment. "Pay-or-play" strategies, as these guarantees have been dubbed, also can be fairly bureaucracy-free, encouraging private investment at minimal public cost.

On the down side, the training guarantees must be carefully designed. If the minimum level is set too high, firms will waste money on unnecessary training; if set too low, the requirement will have no effect. Also, the strategy only indirectly stimulates firms to shift to high performance work systems and provides no direct assistance in reconfiguring workplaces or introducing new technology. Foreign experience also shows that the system can be biased against smaller firms absent countervailing provisions. Finally, some employers may choose to game the system through accounting tap dances, adding administrative costs for the Internal Revenue Service.

One final note: experience abroad indicates that the vast majority of firms will choose to meet this challenge and make the investment in training, rather than pay into a national fund. For example, Australia's training guarantee has achieved 97 percent compliance in only two years.[35]

Training Grants

More than 80 percent of America's states have introduced programs to help companies become more competitive either through advanced technology, technical assistance, or customized training programs. Generally, these programs target grants to smaller firms, and the state works with the company to design programs which will best meet explicitly-stated goals. The better-designed customized training efforts have produced some impressive results, ranging from helping firms expand business opportunities to giving displaced workers new skills and employment.

A substantial number of competing economies, from Japan and Sweden to Germany and Singapore, also have extensive national grant-making training funds, financed through payroll taxes. German corporations, for example, contribute almost 3.5 percent of payroll to national training accounts which back a wide range of employment and training initiatives (including apprenticeship programs).[36]

At the federal level, we provide virtually no support for our state activities even though they can reach only a fraction of the companies requesting aid. We believe a relatively small federal investment could stimulate a significant increase in workplace transformation and training, if the training grants program requires state matching funds and insists that firms share the costs (experience demonstrates better results when firms pay a portion of the expenses). A $500 million federal training grants program could directly boost total training expenditures by $2.0 billion nationwide.[37]

Grants can leverage big changes through small investments, as the tiny Prairie State 2000 bears out. A grants program should target aid to smaller businesses demonstrating need, insist that firms design well-constructed improvement strategies, ensure training for transferable skills, integrate training with high performance workplace reorganization, and coordinate closely with technology and modernization efforts within the state. Outcome standards based on quality, productivity, wage rates, employment and other measures of high performance workplaces should be employed.

While grants offer many advantages, we recognize that they can imply a bureaucratic process. Many small businesses simply may be unaware of potential aid; others may find the application process daunting or time consuming. There's also the risk of substituting public funds for investments the firm would make anyway (although cost-sharing helps mitigate). As well, the targeted nature of training grants means relatively few firms can get assistance, compared to the broad-based, economy-wide strategies like training guarantees.

Minimum Standards

Alternative investment incentives are available, including a narrowly-drawn tax credit for new training expenses, or a required minimum number of training hours per employee. There is no perfect solution — each option has its advantages and drawbacks. But we believe certain basic principles should be applied to corporate training efforts, and linked to whichever incentive is used:

▶ *Joint labor-management committees*, with workers represented by persons of their own choosing through free elections, must help design and oversee training and work reorganization activities. Numerous studies have demonstrated the positive impact of *real* employee involvement; not surprisingly, every single Baldrige Award winner has had programs to enhance worker participation in building high performance workplaces. More importantly, employee participants often will know best which types of training are needed, and will help encourage investments in transferable skills.

▶ *Resources must be equitably distributed* and front-line workers, key contributors to corporate success, should not be denied access to training dollars. Non-discrimination rules such as already exist for health and pension plans could be applied here too.

- *Transferable skills must be emphasized*, not narrow firm, equipment- or vendor-specific skills, to benefit the long-term economic success of both the company and the employee.
- *Contributions to training consortia should qualify* as eligible expenses under the training guarantee; likewise, training grants should be offered to groups of firms. Company and union networks have demonstrably improved diffusion of best practices.

B. Promoting Training by Individuals

Recommendation:

Increase access to lifelong learning opportunities for workers by eliminating certain tax penalties and introducing a broad-based loan system.

Individual workers, like firms, face obstacles to seeking additional training:

- *insufficient resources*;
- *lack of information* about training opportunities;
- *skepticism about return* on investment;
- *dearth of time*, especially with competing demands of family;
- *insecurity about the ability to learn*, especially for those long out of school; and
- *inability to meet training program entrance requirements*, among other impediments.

These obstacles can be especially intimidating for workers who earn less money, have less basic education and face the greatest risk of dislocation. Present federal efforts in their behalf are limited at best. For example, only job-related educational expenses are deductible, which discriminates against front-line workers and discourages skill upgrading: first, because tax deductions generally benefit higher income earners; and second, because the "job-related" test benefits managers, with their broadly defined job-descriptions, but penalizes front-line workers with more narrowly-defined work.

At a minimum, therefore, we believe this tax deduction should be broadened to include skills which will promote long-run employment security. In addition, we urge Congress to permanently extend the existing tax exclusion for employer-paid training; workers shouldn't pay a penalty for participating in skill upgrading activities.

Bolder Reforms

It's time, however, to act more boldly and to rethink our entire educational assistance system for students. Right now, we separate grants and loans for college students from aid to vocational education schools or technical colleges. We also focus on the years immediately following high school graduation, even though we know workers will need education throughout their lives.

A recently-authorized pilot program offers an interesting counter-approach and we believe it should be implemented quickly and expanded if results warrant. Under this program, authored by Senators Paul Simon and David Durenberger, full or part-time students in colleges, universities or technical schools would be eligible, up to age 50, for lifetime loans totalling $70,000. Loans would be repaid according to income, through income taxes, over a minimum term of 25 years.

This program offers several advantages. First, it can save money by reducing administrative costs for numerous separate loan and grant programs. Second, it eliminates bank intermediaries (grants go directly to students), cutting federal costs by $1.4 billion. Third, default rates would fall since repayments would come directly through income tax deductions, freeing another $1.3 billion for direct educational benefits.

One significant caution is in order, however. Despite some *theoretical* notions that putting power in the hands of training consumers will enhance the quality of training programs and ensure market relevance, the reality is that the training market contains huge bottlenecks. At a minimum, consumers lack important information such as what individual skills will be in demand and which training providers are worthy. The effectiveness of programs targeted to individuals therefore requires some of the systemic reforms proposed in Strategy One, such as accessible local labor market boards, and a system of skill and performance standards.

C. Diffusing High Performance

Recommendation:

Provide incentives for firms to design and use work organizations that promote high quality and high productivity.

Though American companies like Motorola or Saturn constitute outstanding examples of high performance systems, we have not managed to extend these very far or very fast. High performance workplaces are diffusing rather slowly through the American economy, especially among our 340,000 small and medium sized businesses which provide the bulk of America's employment (57 percent) and produce one-half of total value added.[38]

Some of our top competitors have more effectively spread high performance elements across industries and firms of different sizes. The difference isn't more benevolent companies, but more far-sighted national policies which help businesses invest in longer term production strategies. Training levies, for example, have encouraged firms to recoup the investment through high performance work systems (the best way to take advantage of skilled front-line workers).

In addition, these countries have extensive public and private networks which help businesses get the information and assistance they need. Japan has nearly 170 local technology centers which allow firms to test the most advanced equipment and train their workers on it. Large Japanese companies often will set up their own training academies and work with their small suppliers to boost productivity and quality. Germany offers technical assistance to local businesses, and its trade associations and labor unions have set up some 600 training consortia. Italy encourages groups of firms to form networks which share information and expertise. America is way behind.

Obstacles for Firms

We must recognize, however, that American companies, especially small and medium sized firms, face daunting barriers to change and innovation. Many small companies simply are unaware of the power of high performance systems — unlike managers in large companies, small firm owners often have narrow, circumscribed markets; few contacts outside of local areas; and little time to attend seminars or read about innovations. Moreover, these small enterprises have difficulty accessing solutions even once they recognize the need — they can't afford expensive consultants (and top tier consultants often won't work with small firms); they don't have the time or expertise to research options and vendors; or they don't know what workplace changes would help them most.

In short, firms need better learning systems and experience at home and abroad has taught us that firms and unions learn best from each other, and from local, tailored information sources.

Company Networks Can Help

One of the best learning mechanisms — inter-firm networks — can be defined in several ways: relationships between large customers and their suppliers; groups of firms in the same industry (e.g., trade associations); geographical groupings based on location; and federations of labor unions. These associations help overcome many of the barriers identified as blocking investment in high performance workplaces; chiefly, they cut the costs of identifying and disseminating best practice. For example, they offer trusted sources of information about the impact of workplace redesign (a neighboring firm can serve as success story and model). They offer help in identifying work system, technology or training needs and potential advisers or vendors. They cut the costs and risks of change, through discounts on services for members or even direct aid from large customers to supplier firms. And they lessen the fear that investments will be lost to free riders since everyone contributes something.

Building High Performance Workplaces

Public strategies should enhance learning opportunities among firms and workers, not impose top-down, bureaucratic solutions. We propose the following tactics to accelerate shared learning and diffusion of best practices:

▶ *Expand federal funding for existing modernization programs* which help firms access the new technology and work practices necessary for high performance, and require these programs to offer complete, well-rounded technical assistance packages. Modern workplaces require retraining and work system redesign, not just advanced technology purchases. Congress already has endorsed these "holistic" efforts in reauthorizing defense modernization programs; now it should strengthen and expand the mandate to all modernization activities and ensure they are closely coordinated with customized training programs.

▶ *Create a second Baldrige Award* which would honor *groups* of firms. Award criteria would be based on how widely high performance systems were distributed across the firm grouping, with the intent of disseminating best practice and saving high honor for companies which not only learn better ways of working but teach them as well. For example, Motorola, a leader in the quality movement and an early Baldrige winner, has created extensive training institutes for suppliers; likewise, Ford works with supplier firms to meet stiff quality standards; and in several states, groups of small firms are creating special training consortia. These efforts should be recognized and encouraged with a prestigious honor.

▶ *Earmark for union and/or company training consortia* a small portion, perhaps five percent, of certain discretionary federal training dollars (e.g., those aimed at school-to-work transition and at skill upgrading activities). Qualifying consortia must negotiate top quality training packages with providers, and offer discounts to consortia members. Consortia also should insist that training providers guarantee results, with workers retrained without charge if the results fall short of agreed upon expectations.

▶ *Clarify federal antitrust law to permit consortia.* While some argue that present law is no obstacle to consortia, firms may remain reluctant to risk prosecution. Thus, we should explicitly state the parameters of allowable cooperation across company lines and make it clear that this is a viable, even desirable, option.

Strategy Three: Enhance School and Work Integration

While other nations have systems for aiding young adults in the shift from school to work, the United States leaves non-college bound youth to their own devices. Japan takes secondary school graduates and puts them through extensive company-based training programs; European nations tend to follow a more formal apprenticeship model where school and work are combined. But in the US, typical high school graduates in the "forgotten half" — the 50 percent of high school students who will not attend college — find themselves in low wage, dead end jobs. It will take a good five to ten years before most (but far from all) will find stable employment, or gain the additional training to open up such opportunities.

Our nation tends to choose against its youth, and its non-college bound especially. Leading firms, those most likely to provide stable employment and quality training, avoid hiring recent high school graduates. According to a Conference Board survey only one in ten large companies hired new high school graduates as they prefer to select older, more seasoned workers for entry-level career opportunities.[39] At the same time, the median age in joint labor-management apprenticeship programs is around 25.[40] Yet while we provide generous public subsidies to those attending college, we virtually ignore those who prefer alternatives. In fact, public expenditures for college students are more than seven times larger than those for non-college bound youth.[41]

America pays a steep price for its failure to better integrate school and work. High youth unemployment levels reach crisis proportions in minority communities (one in five American youth are jobless, and nearly one in three minority youths).[42] A substantial cohort of workers with poor basic skills, little understanding of what work demands and limited grasp of how to find a good job or get good training. And schools that want to help their students but can't for lack of decent feedback systems to make improvements.

The paucity of our investment gives German, Japanese and other nations' youth — and the firms that hire them — a five to ten year head start on competitiveness. Young people in those countries gain mastery of skills, experience meeting work requirements, pride and self-confidence through extensive apprenticeship or on-the-job training programs. In that same period, young American workers are moving from low-skill job to low-skill job, with periods of unemployment in between. That's a pretty shaky foundation upon which to build a high wage career or a high productivity economy; it should come as no surprise that competing economies are catching up.

American and Foreign School-to-Work Systems

To some extent, the bumpy quality of American youth employment offers our young adults an advantage over the Germans or Japanese — they get greater opportunities to experiment and explore career options before settling down. But far too many never quite recover from the rocky start and large numbers of our youth still struggle to find a foothold in the American labor market even as they age into their 30s.

Using data from the National Longitudinal Survey on Youth, a recent analysis found that over 35 percent of men entering their 30s work in jobs they have held less than one year (the pattern holds for women too). Moreover, about a third of these workers have endured unemployment spells of four or more weeks sometime in the previous three years. Their wages suffered too — male high school graduates age 29 to 31 earned an average of $11.15 an hour if they had held jobs for three years or more, and only $8.67 if they had job tenure of less than 12 months. For roughly one third of all American high school graduates, then, our haphazard system does not work.[43]

In contrast, Japanese firms negotiate semi-formal long-term recruitment agreements with schools. The best firms hire the best students from the best schools and then put them through intensive training courses, often rotating new employees through different jobs over the course of several years. Toyota, for instance, says it will put all new high school graduate hires through two years of full time schooling in digital electronics before they begin working on the assembly line.

Germany is well-known for its dual system of combined schooling and work. About 85 percent of German non-college bound students enroll in three or four year apprenticeships which integrate theoretical instruction and hands-on work experience. German companies view the $17 billion they spend annually for this system as an investment in the future, and they get extremely well-skilled workers in return. A machine tool mechanic, for instance, will have mastered college-level math, physics and chemistry as well as technical skills, before he or she hits the shop floor full-time.

State and Local Experiments

The success of these models has led to an explosion of experimentation in states and communities across America (see boxes on the following pages). Some efforts focus on the school as the place to introduce work-related concepts, while other strategies emphasize work-based learning. Regardless, there is a growing recognition that the artificial distinction between academic education on the one hand and occupational skills training on the other has unfairly tracked students into different career paths, left them without the basic skills needed to compete in modern workplaces and ignored the evidence that combining school and work generally makes students better at both.

While youth apprenticeships are most often cited as *the* strategy for improving the school to work transition, they represent but one approach. As promising as they are, apprenticeships comprise one of the most ambitious and expensive strategies as they rely on extensive instruction in progressively greater competencies and sustained employment over several years. There is a diverse range of additional strategies to improve links between school and work: *compacts*, pioneered in Boston, where employers offer job guarantees to students who perform well in school; *co-operative education* where high school seniors work part-time in areas connected to their training specialty; *career academies* where students develop individualized academic and occupational goals around a specific field like health, electronics or graphic arts; *school-based enterprises* where students become entrepreneurs; and *service learning*, where young people work and learn through participation in community service projects, to name just a few.

Integrating School and Work: Selected Examples

"Compacts": The Boston Compact

In 1982 in Boston, the public schools signed a "compact" with the city's businesses, universities, labor unions and the Mayor's office that promised improved academic achievement and work preparation in the schools in exchange for increased opportunities for employment and higher education for city youth. The Compact is seen by many as one important factor in the lower-than-national-average youth unemployment rate in Boston throughout the 1980s and the virtual elimination of black-white differences in youth unemployment rates in the city. The compact strategy uses the promise of employment as an incentive for young people to stay in school and do well; eligibility for jobs and financial aid are tied to staying in school and getting good recommendations from teachers. In addition, the compact strategy uses the mobilization of private sector resources as a carrot to get the school system to pay more attention to the needs of non-college bound youth.

Co-op Education: The Dauphin County Technical School

The Dauphin County Technical School in Harrisburg PA is a typical, well-run co-op program that links a student's high school program with work experience in a closely related field. In this program, employers provide a high school senior with part-time employment in the field of the student's vocational concentration. Two full-time co-op teachers work with employers to develop the new job slots. They prepare with the students and their employers the training agreements that specify the skills employers are expected to teach students. The teachers try to negotiate with employers to include a few additional tasks that add complexity to the largely entry-level jobs. Participation is limited to twelfth graders who had a C average and no Fs or incompletes in eleventh grade. About half the seniors participate. Evaluations of co-op education have shown higher levels of satisfaction with school among high school co-op students.

Excerpted from: Richard Kazis, *Improving the School to Work Transition in the United States*, prepared for the Competitiveness Policy Council, November 1992; Fran Beauman, Testimony before the US Senate.

Integrating School and Work: Selected Examples

Career Academies: Sequoia Union High School District

In the early 1980s, the Sequoia Union High School District created the California Partnership Academies. Each academy is organized around a specific occupation or industry theme (e.g. health, electronics, graphic arts). Beginning in tenth grade, students develop individualized academic and occupational goals and work in the focus industry during the summer after junior year. Employers also donate time as mentors and provide equipment to the school. While there is little specific coordination and integration between students' work experience and their classroom training and while the program does not culminate in a formal credential, the career academies are highly regarded both as drop-out prevention and as college preparatory programs. About two-thirds of academy graduates in California, for example, have continued on to post-secondary education.

Apprenticeship: Maine

Maine's pilot apprenticeship program, built on partnerships between schools and employers, culminates in a joint employer-school "certificate of mastery" that guarantees a student has mastered certain skills. Students begin Maine's program in the ninth grade with general career exploration activities and, in the tenth grade must pass a basic skills test to apply for entry to the apprenticeship program. Once accepted, 11th and 12th graders spend 20 weeks at a regional vocational high school or secondary school and 30 weeks working for an employer. Finally, in the 13th year, apprentices work with their employer for 34 weeks and take 16 weeks of training at a technical college to earn a one-year post-secondary degree. Unlike most other school-to-work programs, apprentices receive wages while working—in Maine about $5,000 a year. In the first year of Maine's program, 50 students enrolled.

SCANS: Secretary's Commission on Achieving Necessary Skills

SCANS, the Secretary's Commission on Achieving Necessary Skills, was created by the Secretary of Labor to examine the demands of the workplace and whether young people in this country were capable of meeting the entry-level requirements of the new economy. The Commission spent two years identifying and formulating a framework for categorizing entry-level workplace competencies. They specified three broad foundation skill areas (basic academic skills, thinking skills, and personal qualities) and five categories of workplace competencies (use of resources, interpersonal skills, information, systems, and technology) that are needed for solid job performance by any worker. SCANS advocates that this "worker know-how" be taught in all schools and that young people receive certificates documenting mastery of SCANS competencies. It also recommends integrating SCANS skills into all federally-funded youth and adult programs, including vocational education. There also has been some modest experimentation with trying to teach and assess SCANS competencies in the schools in Fort Worth, TX, Tampa, FL, and Louisville, KY, among other states and localities.

Excerpted from: Richard Kazis, *Improving the School to Work Transition in the United States*, prepared for the Competitiveness Policy Council, November 1992; Fran Beauman, Testimony before the US Senate.

A consensus has emerged from these experiments — successful programs for integrating school and work — depend on:

- ▶ *active support from local employers* — providing training, mentoring and jobs with career track possibilities, not make-work experiences;
- ▶ *participation by workers,* who most likely will provide on-the-job training;
- ▶ *ongoing, feedback relationships* between schools and workplaces;
- ▶ *integration of academic and vocational learning* so that students master broadly-applicable theoretical as well as technical skills;
- ▶ *combined classroom and workplace learning* so that each reinforces the other;
- ▶ *clear links between high schools and post-secondary institutions* so that students can move easily into technical schools, four-year colleges or careers;
- ▶ *diverse career pathways,* entry and exit points to ensure no student gets tracked into an unwanted occupation;
- ▶ *protections against exploitation* of student-workers as low wage labor; and
- ▶ *broadly-recognized certificates of skill mastery* — accepted by employers as acknowledging skill achievements.

Recommendation:

Expand support for better integration of school and work, and promote promising innovations.

Despite pressures to adopt one single model for integrating school and work, we believe it is more appropriate to continue experimenting with a diverse range of approaches. First, it is still too early to declare a single "winner" — all of these efforts contain advantages and drawbacks. Second, significant obstacles still stand in the way of widespread school-to-work programs; chiefly, lack of employer commitment and the absence of a broader system of skill standards and certifications. Third, we must design a uniquely American program, not import a foreign version wholesale, and that takes time. And fourth, the federal government historically has played only a limited role in this area both because education is seen as a state and local responsibility and because training has been viewed as dealing primarily with disadvantaged and dislocated workers. A massive school-to-work program cannot be implemented before we get a better systemic infrastructure in place.

Equally important is the diverse nature of youth employment problems, not all of which can be addressed through apprenticeship-type programs. Inner city, minority youth face a particularly daunting set of challenges — poverty, inadequate investment in schools, discrimination, crime and other factors which constrain their ability to move easily from classroom to workplace and which cannot be solved solely through programs aimed at integrating academic learning and occupational training.

Fortunately, some activities bear promise. Job Corps, for example, gives high school dropouts both skills and self-confidence in highly structured, often residential settings. Job Corps graduates generally enjoy higher employment rates, greater earnings, enhanced education and less criminal activity, according to several evaluations. Moreover, for every dollar invested in the Job Corps, the program returns $1.46 in economic benefits. The program is expensive, but it works.

Despite these cautions, we strongly advocate steps to pick up the pace of state and local innovation, and to learn from these examples. We therefore call upon the federal government to:

- ▶ *Require the proposed local labor market boards to take the lead* in connecting schools, employers and unions for better integration of school and work. This should be one of their principal responsibilities and top priorities; their annual reports should include data on the extent and progress of these efforts.
- ▶ *Provide incentives to employers and unions* to participate in structured school-and-work programs. Employer expenditures for apprenticeships or other activities promoting school and work integration should qualify as eligible investments under the training guarantee outlined earlier and existing tax

rules. In addition, we must dramatically improve technical assistance for school-and-work programs, and ensure our innovations and best practices are disseminated widely.

▶ *Create a national youth service corps* to permit students to earn scholarship funds and experience careers in service and government fields while contributing to the nation's welfare. Service learning can be just as valuable as private sector training opportunities; indeed, the government should be the first employer to demonstrate the commitment we seek of all employers.

One model of service learning, a demonstration project authored by Senators Wofford and Boren, would use excess military bases and inactive military personnel to work intensively with live-in students. The program permits students to earn up to $5000 in educational scholarships or $2,500 in wages by working on approved community service projects while learning academic skills. This program should be implemented quickly along with other service learning experiments, and expanded nationwide as results warrant.

▶ *Devote a portion of federal economic revitalization and public works programs to youth apprenticeship.* As significant federal resources are invested in rebuilding America's infrastructure, converting defense projects to civilian use or cleaning up the environment, important opportunities emerge for training and employing our nation's youth in skilled occupations. A small portion of these funds should be allocated to structured learning-and-working programs for young adults.

▶ *Boost career information and career counseling* starting with elementary years. To begin with, we should restore and strengthen programs to bring career and labor market information into the schools since career awareness can help students plan for future work requirements.

▶ *Introduce basic academic education standards* into all federal youth employment and training programs and require federally-funded vocational education programs to include a work-based component. Over time, the line between school and jobs programs should dissolve as both move toward an integrated concept of learning and work.

▶ *Expand funding for staff development and training* — the success of any broader school-to-work system will depend significantly on the skills and abilities of the teachers and counselors within it.

▶ *Ensure adequate support for research, evaluation and dissemination of best practice.* We can't learn from experiments without quality evaluations and mechanisms to share lessons learned.

Strategy Four: Ease the Adjustment Process

The flexibility imperative imposed by today's global market applies not just to firms but to nations as well. With the pace of economic change accelerating dramatically, and traditional buffers fast disappearing, sustained American well-being depends more than ever on the ability to quickly meet new challenges.

For some workers and their employers, these changes will offer fresh opportunities — new business, better jobs, higher wages. For others, however, these changes will bring hardship and pain — business shrinkage, unemployment (often for long stretches of time), or jobs which pay lower wages and offer poorer benefits. So while the majority may gain, for the latter workers and employers, as well as the communities which support them, economic restructuring can carry a steep price tag.

To help promote easier and quicker adjustment, we offer displaced workers various forms of assistance. In addition to unemployment compensation, and employment service functions, the federal government primarily relies upon the Trade Adjustment Assistance (TAA) program, which targets benefits to a relatively narrow group of eligible workers, and the broadly accessible, but lesser benefit, Economic Dislocation and Worker Adjustment Assistance Act, or EDWAA. None of these programs, however, reaches anywhere near the majority of dislocated workers. EDWAA enrolled 187,000 workers in 1991 — reaching only about 15 percent of all dislocated workers — while TAA delivered benefits to about 25,000 that year.[44]

Today, American workers face huge and growing pressures on job security. International trade represents a quarter of our GNP, and with trade barriers falling, it almost certainly will become even more central to our economy. As firms respond to increased international competition, some may introduce changes which would erode employment; for example, they may increase automation or "outsource" production to offshore locations. In addition, the end of the Cold War has introduced yet another pressing need: adjustment services for those directly and indirectly employed by the military sector.

The principal answer to these challenges must and can be to avoid dislocation, rather than to force workers, firms and society to bear the substantial costs of job loss. Toward that end, we believe that employment security, and the maintenance of quality standards of living, must become central organizing principles in our labor market policies. America's strategies should primarily be oriented to helping firms and workers become more competitive in today's economy *before* they need to downsize or layoff. For these reasons, the bulk of our recommendations in this report address that goal.

But dislocation cannot be avoided entirely and we must invest in effective adjustment strategies. Now, more than ever before, it is incumbent upon us to provide sufficient support — not as political payoff, or even as compassionate payment, but as a crucial piece of the effort to become a more competitive, prosperous and cohesive nation.

Trends in Dislocation

In the five years from 1987 to 1992, 5.6 million American workers lost permanent jobs (defined as having been held for three years or more) and were counted as displaced by the Bureau of Labor Statistics. By January of 1992, more than a third still were looking for work or had dropped out of the labor force entirely. Moreover, of those who regained full time work, nearly half (48 percent) earn less money today than in their old jobs, with most suffering pay cuts of 20 percent or more. And when part-time and self-employed workers are counted as well, the share of those now earning lower wages jumps to 55 percent.[45]

The earnings drop for displaced workers often is exacerbated by the forfeiture of important benefits like health insurance and pensions. Of the 5.6 million workers displaced since 1987, 4.2 million, or 75 percent, lost jobs which provided health insurance. By 1992, 2.9 million had regained some health coverage, either through new jobs or other sources (e.g., paying for insurance out of pocket), but nearly a quarter remained completely uninsured.

Factors Behind Dislocation

Several forces drive dislocation: structural shifts in the economy; technological change; new consumer demands; and expanding international economic competition. Imports, particularly in manufactured goods, account for a substantial portion of the jobs eliminated over the past decade. While much of the nation's mid-1980s trade deficit can be attributed to an overvalued dollar, the persistent nature of our trade shortfalls, and the corresponding consistent surpluses among some of our trading partners like Japan, indicate that import penetration is more than just a temporary or cyclical function which can be fine-tuned through macroeconomic policies.

Global competition affects employment in several ways. While we believe there's ample evidence that competition can and must be met through high performance, high wage strategies, we recognize that unfortunately relatively few firms have selected this approach so far. Rather, some firms have responded by shutting down plants and escaping lines of business entirely. Others looked to cut costs by shifting all or part of their production to domestic and overseas locations which offer cheaper labor costs. Many industries moved to automate as well, following a traditional strategy of shrinking costs and enhancing productivity through capital improvements or, as some would more bluntly put it, replacing people with machines. To a great extent, then, technological change is bound up with international competition.

New Employment Security Threats

Employees in industries susceptible to international competition face a greater likelihood of displacement and, given current trends, their vulnerability will grow (absent policies to the contrary). In addition, some very specific policy changes have introduced heightened requirements for better adjustment policies:

▶ The recently-negotiated North American Free Trade Agreement (NAFTA) is variously estimated to cause job loss of between 150,000 by 1995 and 550,000 by 2002.[46] The trade pact will have differing impacts — lower skilled workers likely will find themselves competing more directly with Mexican employees, for example, and certain sectors, like auto parts, consumer electronics and apparel manufacture, will be at greater risk.[47]

▶ Direct and indirect military employment will shrink as the Cold War ends. Two-thirds of the 190,000 factory jobs lost last year were in military-related industries like aerospace and communications. The Congressional Office of Technology Assessment predicts that defense-related employment (including armed forces, civilian Department of Defense jobs, and jobs with military contractors) may fall from 6 million in 1991 to 3.5 million by year 2001, or 250,000 each year.[48] Here too the impact will deviate, especially depending on location, as about one-half of American defense-related jobs are located in just eight states.[49]

▶ Certain environmental protections could cause substantial short-term job loss. New clean air rules may eliminate as many as 50,000 jobs by year 2000, chiefly in coal mining and manufacturing plants using high-sulphur coal. Endangered species protections also could erode employment, particularly in forest industries in the Pacific Northwest.

Current Displaced Worker Programs

The federal response to displaced workers falls into four main programs. In addition, Congress has created special accounts for workers affected by particular governmental policies — for example, a $50 million appropriation for workers affected by Clean Air rules; and the $150 million fund for those displaced by defense cut-backs. These are administered through the general EDWAA program, however.

The four core programs are:

(1) ***The federal unemployment insurance (UI) system,*** created in 1936, provides workers with their principal sources of income during short spells of joblessness. Typically, claimants get 35 to 40 percent of their pre-layoff weekly earnings for up to six months. After six months, laid off workers can apply for extended benefits, receiving income support for another 13 weeks in cases of severe economic downturn. Most claimants are not dislocated workers (i.e., suffering a permanent job loss after extended tenure), but rather tend to be shorter-term, or cyclically, unemployed.

The American unemployment insurance system provides relatively weak benefits compared to other industrialized nations. We provide on average less than half of prior earnings, as compared to 60 percent of wages in Canada, up to 68 percent in Germany, and fully 80 percent for some workers in Japan.[50] Moreover, our system serves only a fraction of the unemployed — only four of ten unemployed workers in 1990 — as it excludes new entrants, re-entrants and voluntary job leavers.

(2) ***The Employment Service (ES)*** operates as an adjunct to the UI system, primarily acting as a job service to match unemployed workers with hiring firms. Although part of its mandate, the ES tends to provide relatively little skills assess-

ment, career counseling, training or job placement to displaced workers, perhaps because of significant budget cuts imposed during the 1980s. Analysts point to the cost effectiveness of the Employment Service, but high wage employers rarely look to the ES for labor exchange functions.

(3) ***The Trade Adjustment Assistance (TAA)*** program has variously served substantial portions of displaced employees and virtually none as eligibility criteria have changed. Created in 1962 to protect workers harmed by the Kennedy Round of tariff cuts, the program aims to provide income maintenance and training benefits to workers directly hit by import competition.

Tightly drawn entrance requirements prevented anyone from receiving benefits until 1969. After rules were loosened in 1974, participation surged to more than half a million in 1980, but when expenditures soared as well, President Reagan tried to abolish the program entirely and Congress, as part of a political compromise, narrowed eligibility. Today, only a small fraction of trade-affected workers receive readjustment services; generally, only those who can prove direct job displacement due to imports.

As eligibility rules have fluctuated, TAA benefits have remained more adequate than other dislocated worker programs, principally by offering income support and retraining provisions to permit longer term adjustment strategies. Qualified employees can get UI benefits for up to 52 weeks and receive an additional six months of wage replacement if they are enrolled in training programs. In addition, TAA will provide workers with vouchers to pay for training and other services; the average voucher was $5,000 in 1990.[51]

Some critics fault TAA for tending to encourage expensive retraining options when workers might be better served by accurate skills assessment and realistic job counseling. Others point to TAA's narrow eligibility rules, which tend to exclude so many workers from coverage, as a serious problem area. But advocates point out that despite some problems, it would be wrong to eliminate the program unless and until much better benefits were available.

(4) ***The Economic Dislocation and Worker Adjustment Assistance Act (EDWAA)*** serves the largest number of displaced workers — 288,000 in 1990 — since it draws few restrictions on eligibility (workers need only demonstrate little possibility of returning to their previous jobs). But it offers fewer benefits than TAA.

While EDWAA funds may be used for a wide range of services, including job search assistance, skills assessment, and career counseling, the program's core activities include:

- rapid response, often through teams which work with individual companies and their workers, to help employees get available services and adopt a solid adjustment plan; and
- short-term training, averaging less than 14 weeks, for workers who need it to regain employment; in fact, EDWAA rules require that 50 percent of the funds be spent on training.

A related program — the Worker Adjustment and Retraining Notification Act or WARN — requires employers with 100 or more employees to give at least 60 days advance notice of certain plant closings.

Positive aspects of EDWAA services include the rapid response teams, the broad range of services it can offer, and the open nature of eligibility. Detractors have suggested a number of weaknesses, such as an overemphasis on short-term training and the lack of income support which could facilitate longer-term skill upgrading.

Some Lessons Learned

After 50 years of experience with displaced workers programs, various evaluation studies have drawn certain conclusions about what works and what doesn't.[52] Some of the key lessons include:

- Once a worker becomes unemployed, his or her chances of regaining employment decline. The more employees can prepare and plan for displacement, the better chance they have at achieving successful adjustment. Thus, the earliest possible notification to workers of pending plant closings or other displacement events, as well as rapid mobilization of resources to assist employees, are critical ways to cut the costs of dislocation.

- Plant-specific adjustment projects, administered by joint management-labor teams, tend to produce the best results. Services can be more efficiently targeted to a group of workers and better designed and scheduled for their needs, among other benefits.
- The unique characteristics of displaced workers argue for some different services than those which might be offered to temporarily jobless employees. For example, their long job tenure means job search skills will be rusty and the small chance of regaining jobs in the same industry implies the need for a change in occupation, industry or both.
- Job search assistance, skills assessment, and career counseling can provide very effective assistance to the majority of dislocated employees at minimal cost. In fact, a good "intake" process is a prerequisite for effectively matching workers' needs with appropriate services.
- Training contributes to successful adjustment, but constitutes no silver bullet. Short-term training, to brush up on job search skills, or upgrade some marketable talents, can be effective in shrinking the jobless period. In addition, many of the workers most vulnerable to dislocation also tend to have had the least access to training during their careers; they often need refresher courses in basic and other skills to overcome impediments to rehire. But the key to larger occupational or industry shifts is having access to good training programs, getting adequate income and other support for the training period, *and* finding a job.
- Wage retention is an important measurement of successful adjustment. Once re-employed, the typical displaced worker still earns only 70 to 80 percent of prior earnings.
- Displaced workers increasingly face non-income impediments to retraining and reemployment, including lack of health care and child care.
- Services should be coordinated to offer workers a complete package from assessment and counseling to training and placement as needed. Moreover, results improve when adjustment services are connected to accurate labor market information (e.g., what jobs are available and what skills are in demand) and when workers receive continued support and encouragement throughout the adjustment period.
- Inadequate resources can undermine even the best-designed program. Many of the adjustment strategies contained within existing programs could be more effective if sufficient resources were applied.

Steps Toward Better Adjustment

Though the best strategy for dealing with displacement is to avoid it in the first place by becoming a more competitive nation, we recognize the growing pressures toward dislocation and believe those harmed by economic changes must be generously assisted in the transition.

First, adjustment policies help ensure that the impact of economic changes is not disproportionately concentrated on certain employees. Second, assisting workers in the conversion from layoff to reemployment, and especially to jobs which offer higher wage retention, will raise revenues and minimize direct government expenditures in the form of unemployment compensation, welfare, food stamps, Medicaid and other outlays associated with joblessness. Third, adjustment facilitates flexibility and permits quicker attention to dynamic economic opportunities. Finally, good adjustment programs can enhance long term employment security, if they are combined with other competitiveness strategies. Both Sweden and Japan, for example, used adjustment programs (albeit in quite different formats) to shift employment patterns from declining industrial sectors to growth industries, thereby both enhancing employment in the long run and minimizing harm in the short run.

We propose that Congress and the Administration take a dramatic step toward enhancing the benefits available to dislocated workers, and begin building a more generous and coherent program. We think it's time that we stopped forcing workers to jump through hoops to access different adjustment services depending on the particular cause of their displacement. Cumbersome procedures create administrative confusion and bureaucratic waste, but perhaps most significantly, they effectively exclude tens of thousands of potential beneficiaries who fail to meet narrow tests. It matters little to the displaced worker whether the job was eliminated directly or indirectly by imports, technological change, government policy or defense downsizing; what matters is the right kind of help.

Past efforts to consolidate have proposed very inadequate benefit levels. Creating a comprehensive program should not be used as an excuse to drive benefits down; rather, we must raise services up to the levels urgently needed in order to promote adjustment and flexibility. None of our existing programs can be considered excessively generous; to the contrary, there is substantial room for improvement.

Recommendation:

Create an effective, meaningful worker adjustment program, backed by secure and adequate funding.

We urge the design of a comprehensive worker adjustment entitlement program, securely funded and overseen by the local labor market boards, to provide the following:

- *Quality "intake" procedures* to quickly apprise workers of their options, assess their skills and facilitate their job search. Many states have excelled at rapid response, but others have not. Performance standards and funding decisions should include measurements based on the rapidity of reaction.
- *Improved and expanded employment service functions* which will offer comprehensive job search assistance, skills assessment, counseling, and referral services. Performance standards to measure the *quality* of placements and referrals should be imposed and the services should be overseen by the proposed local labor market boards.
- *Adequate income support* set at levels more comparable to those of our economic competitors; for example, 65 percent of prior earnings. Income support is essential for longer term retraining.
- *A wage supplement* to help workers return to work faster without suffering severe income drops. For example, qualified employees could retain prior earnings through a combination of private wages and supplementary public support for up to two years (on average, employees regain prior earning levels in about two years).
- *Payments for retraining programs* and extended income payments and other benefits during the training period.
- *Health care coverage* which, in the absence of a universal health care plan (the preferred alternative), may require special provisions for displaced workers who have lost access. One option could insist that certain employers maintain all or part of health insurance premiums for a set period. Improved income support also may help more displaced workers retain health coverage through existing COBRA "buy-in" options.[53]
- *Joint labor-management committees within worksites* to design and administer adjustment services. Federal performance standards and funding allocations should reward state efforts to expand the use of joint committees.

Interim Measures

We recognize that since this proposed program will require significant funding and time to develop, interim steps may be in order. Accordingly, we should begin with the best existing activities and expand them over time in terms of benefits and eligible beneficiaries. One of the top priorities should be workers directly harmed by government policy changes.

IV. Conclusion

In a world where political boundaries have little meaning for most elements of production, the skills of a nation's workforce can make or break economic vitality. Capital and technology cross borders with ease; information spins around the world in seconds; natural resources no longer guarantee a comparative advantage. But innovation and knowledge increasingly comprise a crucial asset; the firm or nation which first discovers a new product, or designs a better process for manufacturing it, can gain an important, if thin, wedge on its competition. Moreover, knowledge-based strategies are much more difficult for competitors to copy, as creativity cannot be replicated as easily as technology or low skill work.

We've tended to underutilize these strategies, however, at considerable cost to our economy. Our economic competitors not only are catching up but beginning to surpass us in the way that matters most: the well-being of our people.

But we are not consigned to a grim future; to the contrary, enormous opportunities stretch before us. America can maintain its economic power and international leadership by focusing on the workplace — building high performance systems that marry skilled, responsible and respected workers with modern, sophisticated technology. This will take strong commitments from and effective partnerships between business, labor and government. It's time we got started.

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35. Australia implemented its training guarantee in 1990 — 1.5 percent of payroll for all firms with annual payrolls over $200,000.

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37. With a one-for-one state matching requirement, $500 million in federal funds would generate a total of $1 billion in public funds. In turn, a matching requirement for firms would mean $2 billion in total increased investment.

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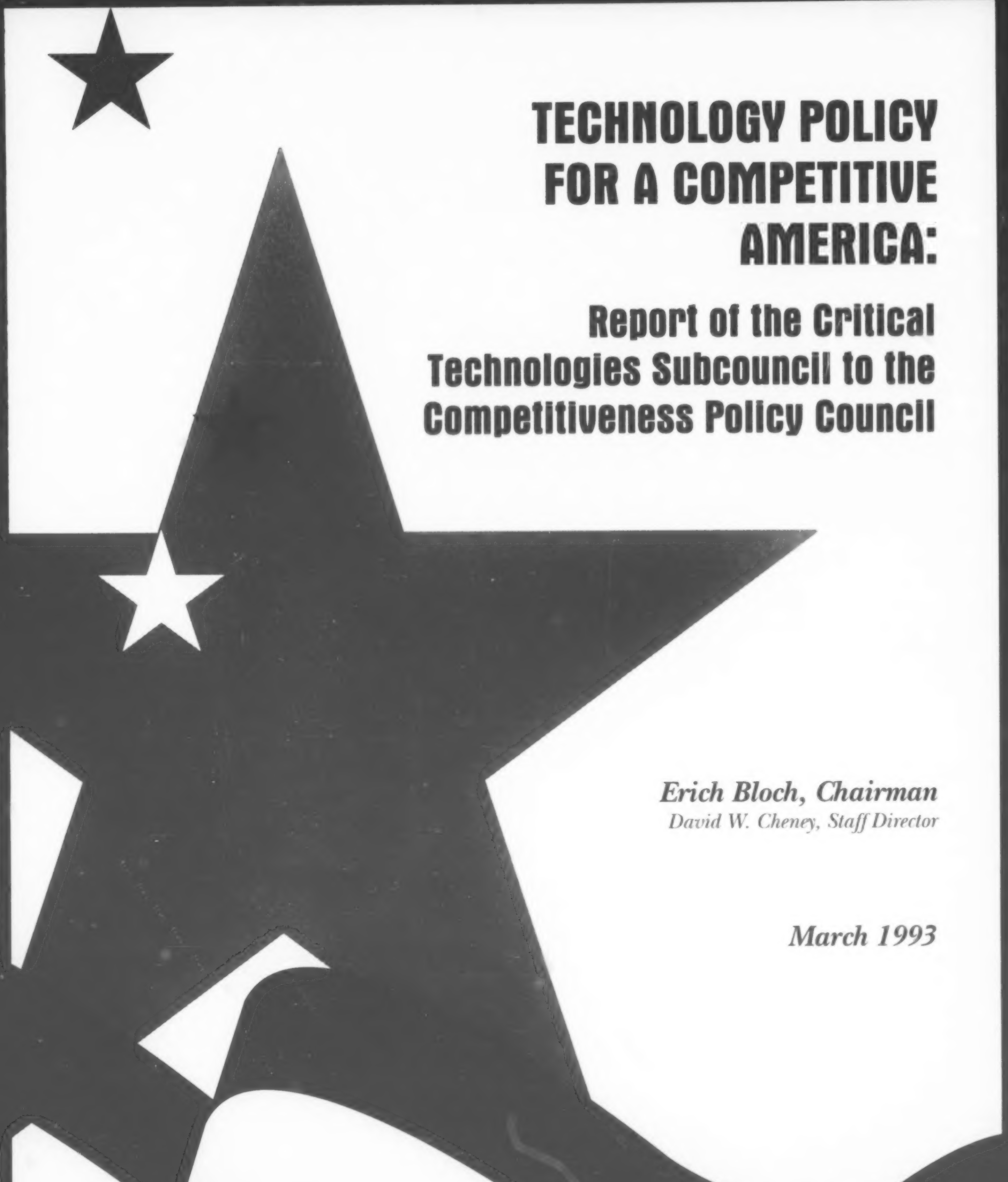

TECHNOLOGY POLICY FOR A COMPETITIVE AMERICA:

Report of the Critical Technologies Subcouncil to the Competitiveness Policy Council

Erich Bloch, Chairman
David W. Cheney, Staff Director

March 1993

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Dear Fred:

As per our mandate, the Critical Technologies Subcouncil of the Competitiveness Policy Council has been working to develop detailed recommendations for improving the contribution of technology to America's economic welfare. The group met six times between June and December of 1992 in an intense effort to develop a comprehensive national strategy for US leadership in technology. This report presents our strategy and recommendations.

From the beginning, the Subcouncil shared views that shaped its recommendations. First, we agreed that the mission was broader than that implied by the "Critical Technologies" title. With the end of the Cold War and a new national focus on improving US economic performance, the nation needs to reexamine its system of developing and applying technology. Our goal was to create a comprehensive technology strategy which reflects these new priorities.

Second, we agreed on the need to define "technology" broadly and to focus on the application as well as the development of technology. In an era when technical information and ideas flow rapidly around the world, the ability to absorb and apply technology, the skills of the workforce, and the knowledge embodied in organizations are essential for leadership in technology.

Third, we agreed to build on rather than repeat the wealth of previous studies of critical technologies and technology policy. These studies have documented the deterioration of America's technological leadership and the discouraging outlook for the future, and have developed many recommendations to improve the US performance. We evaluated and built upon the best of those recommendations, and focused on how to make them implementable.

Fourth, it was clear that America has enormous technological capabilities in its universities, industry, workforce, and government laboratories, but that we are not using these resources effectively. For any strategy to be effective, it must build cooperation between these sectors of the nation, and be supported by each of them.

The Subcouncil was uniquely suited for this task. Our members were selected for their expertise and diverse experiences in shaping, using, and analyzing technology policy from the perspectives of industry, government, labor, and academia. Their experience within government ranges from the Congress, to the Executive Office of the President, to the many departments and agencies. The group was in a position not only to identify sound policies that could be effectively implemented, but, equally importantly, judge proposals that looked good on paper but were unlikely to work in practice.

With the end of the Cold War and the new consensus on the need to improve our economic performance, there is a window of opportunity to restructure America's technology policies to meet the needs of the new era. To take advantage of this window, the proposals put forth must be effective, acted upon quickly, and represent a consensus of industry, government, and academia, and labor. They should also create a framework that US technology policy can build upon for the future. The strategy we lay forth here is a cohesive set of such proposals. They are comprehensive and challenging, but also practical and implementable. We believe they will have a significant impact on US technology leadership.

The priority now is for action. The Subcouncil plans to work with the Competitiveness Policy Council to see the recommendations in this report fully implemented, and we will call on industry, the Administration, Congress, labor, universities, and the states to actively support our efforts.

Sincerely,

Erich Bloch
Chairman, Critical Technologies Subcouncil

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Executive Summary

The development and application of technology is a key driver of American economic growth, competitiveness, and increases in the US standard of living. Advances in technology enable the creation of new products and industries, improve existing products and reduce the cost of making them. In addition, competition in many of the fastest growing manufacturing industries, including electronics, biotechnology, aerospace, and communications, is primarily based on skill in developing and applying technology.

Applying new technologies well is vital in nearly all manufacturing and service industries and is essential to achieving other national goals, such as military security, protection of the environment, and energy conservation. Technological leadership is especially important to US firms since they have relied on it to overcome other disadvantages relative to their international competitors, including less patient capital, a less supportive trade policy, and high health care costs.

For most of the past 50 years, technology has been an unquestioned American strength. US industry was the leader in virtually all key areas of civilian technology and was not seriously challenged in any technology intensive commercial industries. Today, US industry's share of both domestic and global markets has decreased dramatically in many high technology industries. In many leading edge areas of technology, US leadership has declined or has been lost.

Much of this change can be attributed to the improved performance of our competitors, who have coupled increased investment in research and development (R&D) with the development of skills to speed the application of technology to commercial opportunities. US support for technology, on the other hand, is still largely conducted within a framework developed for the Cold War. The government funds primarily basic research and R&D in support of government missions, dominated by defense. This system functioned well in the 1950s and 1960s when US companies were far ahead of their international rivals but is less effective today when defense no longer drives commercial technologies and foreign competitors have vastly improved their capabilities.

US policy and industry practices have begun to respond to the changing international environment, but in general, action has been too little, too slow, and uncoordinated. There are still many opportunities to improve.

Compared to our competitors, the federal government continues to spend significantly more on defense technologies and much less on R&D and technology to help expand commercial opportunities and solve industrial problems. The private sector also underinvests in areas that are a prerequisite for effective commercialization, including R&D, plant and equipment and training. In addition, government and the private sector are not taking full advantage of opportunities to use their resources more effectively by cooperating in areas of mutual interest.

The domestic infrastructure necessary to capture and apply technical information is also being neglected. Today, many elements of technology flow freely around the world and the capacity for a nation to quickly absorb and disseminate technology is a key contributor to a nation's ability to benefit from advances in technology. The US needs a strong infrastructure of research facilities, skilled workers, information networks, and manufacturing capabilities to take advantage of technology being developed internationally and to make the United States an attractive place for R&D and high value-added manufacturing.

Despite these problems, the United States science and technology enterprise still has many outstanding strengths, including unparalleled research universities, an open and entrepreneurial climate that attracts the best minds and ideas from around the world, technically strong national laboratories, and strong corporate research laboratories. The US still leads the world in generating inventions, and has increasingly refocused on high quality manufacturing.

We believe the US needs a national technology strategy to effectively mobilize these existing strengths and cooperatively address problems within the current technology system. The ultimate goal of the strategy we propose is US leadership in the development and application of technology to promote industrial competitiveness, economic growth and an improved standard of living. This does not mean the US must or can obtain absolute leadership in all technologies. Those days are past. But we should be at the leading edge of all important areas of technology, and be second to none in our ability to use those technologies.

To effectively develop and implement such a national technology strategy, a greater focus on technology and competitiveness is needed at several levels of government. At the policy level, there is little coordination between technology policy and economic, trade, regulatory, and education policy. These all significantly affect technology leadership. At the program level, technological resources and decision-making authority are dispersed throughout the federal government, industry, the states, and universities. There is currently limited capability to implement programs that cut across these institutions.

With the end of the Cold War there is an unprecedented opportunity to rethink our approach to technology and forge a new national strategy that will mobilize the technological capabilities and great strengths of the US towards priorities of economic competition. There is an opportunity to get industry, academia, and government working together to enhance the contribution of technology to the national welfare. The recommendations outlined below will do this.

Key Recommendations

1. Increase National Investment in Civilian and Dual-Use R&D

Civilian R&D is an important driving force of technology leadership, yet US investment in this area remains far below that of its foreign competitors. The US system of R&D should be modified to increase private sector investment in R&D, assure that federal R&D is relevant to industrial needs, and maintain national investment in non-military R&D, as a percentage of gross domestic product (GDP), so that it is competitive with that of other leading industrial nations. The following actions should be taken to achieve this goal:

▶ ***Stimulate private sector R&D.*** Industry-funded R&D most accurately reflects the needs and wants of the market, yet US industry funds a significantly lower level of R&D as a percentage of GDP than any of our major competitors. This underinvestment may be attributed to growing competition, increased pressure to show profits and an unfavorable investment climate. A permanent R&D tax credit that includes process R&D and additional credits for industry-sponsored academic R&D and consortia should be established to encourage increased industry investment in R&D.

▶ ***Use federal resources made available through defense reduction to build civilian and dual-use R&D.*** As a first step, $7.2 billion should be shifted from defense production and R&D to priority civilian research and technology programs. This will equalize federal support for defense and civilian R&D. The defense acquisition system should also be restructured to take advantage of today's civilian technology and ensure a more flexible, less bureaucratic relationship between government and industry.

▶ ***Focus federal R&D to improve economic performance.*** Valuable expertise, equipment and facilities are housed within the government system of R&D, but for the most part, these strengths have not been focused on civilian needs. To direct federal R&D capabilities more effectively towards civilian needs, industry-driven cooperative R&D programs should be increased where federal agency missions coincide with commercial interests.

Specific actions that should be taken include increasing private sector input into agency R&D priority setting, through both advisory committees and informal contacts, and reallocating at a minimum an equivalent of 10-20 percent of Department of Energy and National Aeronautics and Space Administration lab R&D to support jointly planned and funded industry/government R&D, with the stipulation that the funding will be cut if not adequately refocused on industrial needs. In addition, government R&D programs in which industry shares in the cost and participates in setting priorities, including the Advanced Technology Program (ATP) in the Department of Commerce and the National Science Foundation's Engineering Research Centers, should be expanded. The Federal Coordinating Council for Science, Engineering and Technology (FCCSET) initiatives should also be expanded and modified to increase private sector participation. Private sector cost sharing and input in these programs are important to ensure that the R&D is relevant to industry needs and is disciplined by market forces.

2. Promote Commercialization of Strategic Technology

The central problem in the US performance in technology is the failure of the private sector to adequately commercialize technologies. This is largely due to an unfavorable financial environment that has caused industry to underinvest in technology and related areas such as training. Although there is no single mechanism that will address all aspects of the commercialization problem, there are several ways that public policy can make investments more favorable for the private sector and the investment community. They include the following:

▶ ***Lower the technical risk.*** Technical risk can be reduced through federal support for research, development, testing or demonstration of technologies. Joint industry/government projects designed to develop, test, and demonstrate advanced technologies in areas of mutual interest are appropriate mechanisms for reducing the technical risk that individual firms must bear to develop and commercialize technology. Possible joint projects include expanded communications and networking within the High Performance Computing and Communications Initiative; a program to develop environmental technologies; and programs to develop more efficient transportation systems. In addition, current and future cross-agency technology initiatives, such as the Advanced Materials and Processing Programs and the forthcoming initiative on Advanced Manufacturing, should expand their current focus on R&D and develop plans that address the commercialization of technology.

Cooperation among firms can also reduce the risk born by individual companies. Industry's use of R&D consortia has greatly increased since the National Cooperative Research Act (NCRA) of 1984 reduced antitrust barriers to cooperative R&D. In many capital intensive industries, collaboration in manufacturing is also becoming increasingly necessary due to the high cost of developing new manufacturing facilities. The NCRA should be extended to provide limited antitrust exemption for US-based joint production ventures. The Subcouncil also supports further efforts to expand cooperative R&D through the consortia tax credit mentioned previously, as well as through direct government funding of R&D consortia, such as SEMATECH and the Advanced Battery Consortium.

▶ ***Reduce market risk.*** The government can also promote commercialization by reducing the market risk for goods using leading edge technologies. Defense has been the traditional driver of federal procurement of technology, and although this role is declining, there are still many opportunities for government to demonstrate or be a smart "first customer" of commercial technologies through purchases for internal use, government missions, national infrastructure projects, etc. This government "pull" can serve as a catalyst for industrial commercialization by testing and demonstrating leading edge technologies and by helping industry gain the experience needed for scale-up and manufacturing of commercial products.

Many of the joint projects mentioned previously will help to expand markets for new technologies in their targeted areas. The following actions will also encourage innovation and help stimulate markets in many other areas:

(1) Modify procurement regulations for agency purchases or agency contracted development to give priority to commercial specifications and products;
(2) Evaluate selection criteria for bids to minimize life-cycle cost rather than acquisition cost;
(3) Base government procurement on performance standards; and
(4) Experiment with agency procurement budgets to allow them to flexibly procure leading edge technologies.

▶ ***Lower the cost of financing for technology commercialization.*** The following approaches should be considered to help finance industrial commercialization of promising technologies:

(1) Authorize Defense Advanced Research Projects Agency (DARPA), ATP, and the National Institutes of Health (NIH) to purchase equity or extend loans/loan guarantees to help support commercialization of promising technologies developed through their R&D contracts.

(2) Support small business by establishing an additional phase to the Small Business Innovation Research program (SBIR) to provide loans for commercialization.

With these approaches, the work would already be within the federal agency's mission, justifying continued federal support. In addition, the agencies are knowledgeable about the technological opportunities and the progress made in their R&D efforts, putting them in a good position to select the most promising technologies for commercialization. Finally, some agencies, such as DARPA, have demonstrated competence in facilitating the commercialization of technologies. Other agencies would need to build business expertise in their in-house staff, or rely on advice from outside experts in order to effectively manage these programs.

3. Create a World Class Technology Base

A strong domestic technology base of human resources, technically capable small manufacturing companies, research and testing facilities, and human and electronic networks supports R&D and high value added manufacturing and helps ensure that US based companies have the capacity to make use of global flows of technical information. The following actions should be taken to strengthen the US technology base:

▶ ***Strengthen the human resource base needed for superior technology development and manufacturing.*** The knowledge, skills and experience of the workforce are at the core of all successful technology development and commercialization. Government action should target every segment of the US labor pool, from researchers and engineers to workers on the production floor. Priority actions include establishing incentives for workforce training; increasing interaction between industry, university and government scientists and engineers; and creating an apprenticeship and training program for non-college bound youth that is recognized and respected by industry.

▶ ***Increase federal support for industry-relevant R&D facilities.*** Many large experimental facilities, such as synchrotron light sources, the cold neutron source, and the high magnetic field lab, are beyond the capacity of individual firms. Government support for these facilities, in conjunction with measures to give industry easy access to government owned facilities, will help assure that industry has access to the tools and instrumentation it needs to effectively absorb and apply technology. Examples of appropriate programs in this area, besides the facilities and instrumentation mentioned above, include initiatives to develop a national information infrastructure. Of particular importance are networks that will allow manufacturers to exchange technical information on products and processes.

▶ ***Strengthen the manufacturing base.*** Technically capable manufacturing companies are an essential part of a strong technology base. US manufacturing extension programs should be expanded to give more manufacturing firms easy access to new technologies, testing facilities, quality management and training programs. This will help improve their competitiveness as well as the competitiveness of their customers. Federal initiatives should require industry and state cost-sharing and build on and support state and local extension programs.

4. Organize US Institutions for Results

US institutions must be better focused on new priorities of economic competition. The new organizational structure must elevate technology policy to priority status, support each stage of the innovation process, and encourage interaction and collaboration within and among federal government, states, industry and academia.

▶ ***Improve technology policy development and implementation in the Executive Branch.*** Within the Executive Branch, support for R&D is dispersed throughout agencies with different missions and goals; linkages between federal technology policy and industry needs are weak; and there are few connections between technology policy and economic policy, regulatory policy, trade policy.

The Subcouncil recommends the following specific actions to address these disconnects and provide the Executive Branch with the knowledge and authority to make informed technology policy decisions:

(1) Create a White House Council on Science, Technology, and Environmental Policy to set directions and policy.

(2) Enlarge the Office of Science and Technology Program structure to serve multiple missions, including providing advice to the President on science, technology, and manufacturing and managing the FCCSET process.

(3) Change the President's Council of Advisers on Science and Technology to include manufacturing and establish it as the focal point for private sector input and joint industry, academic, and government prioritization of the R&D budget

(4) Enhance the capabilities of the Technology Administration in the Department of Commerce and make it a focal point for industry analysis and international technical information.

▶ ***Focus Congress on technology.*** The federal R&D budget is handled by many authorizing committees and appropriations subcommittees within Congress, making it nearly impossible to produce a comprehensive R&D budget that effectively mobilizes resources towards urgent national needs. This committee structure must be realigned to create a more coherent R&D appropriations process that reflects current priorities of economic competitiveness.

I. Introduction

The goal of the Subcouncil on Critical Technology has been to develop a national technology strategy that will sustain long-term US leadership in the development and application of technology to promote industrial competitiveness, productivity increases and an improved standard of living.

We firmly believe that it is important to emphasize both the development *and* the application of technology. Too often people view invention in the laboratory as an end in itself, but technology only boosts industrial competitiveness and national welfare if it is applied promptly and effectively. It is the technology embodied in superior products and processes that ultimately generates wealth and makes possible sustained investment in technology and products, and through this feedback loop ensures continued leadership in technology.

Similarly, the Subcouncil promotes a view of technology[1] that is broader than just hardware, software, or patents; it also includes the know-how, processes, skills, and organizational systems needed to apply knowledge to useful purposes. These components are developed through education, training, and manufacturing as well as through research and development (R&D). It is essential that technology policies recognize the importance of the human element in technical systems, and encourage the development of process and production technologies that are "worker friendly" and that build on, rather than minimize, worker skills.

US leadership in technology is a crucial national goal for several reasons. First, superior development and application of technology is the principal driver of economic and productivity growth in all industrial societies.[2] Advances in technology enable the creation of new products and industries, improve existing products and reduce the cost of making them. This helps firms build or maintain a competitive advantage and increases the standard of living of the nation. Technological leadership is especially important since in recent years US firms have had to contend with a number of disadvantages in relation to their international competitors, including less patient capital, weaker trade policy, and high health care costs. Technology has been, and must remain a compensating source of competitive strength.

Second, competition in many of the fastest growing manufacturing industries, including electronics, biotechnology, aerospace, and communications, is primarily based on skill in developing and applying technology. Output from these and other high-tech industries[3] increased from 17 percent to 25 percent of global production of manufactured goods between 1980 and 1988.[4] Maintaining a lead in the technologies that drive these areas is critical for US economic growth and a positive trade balance.

Third, development and application of technology is central to achieving other national goals, such as military security, protection of the environment and energy conservation. Technology embodied in weapons, information gathering and communications systems has been the primary source of US military superiority for decades. Technology applied to the development of energy efficient and environmentally sustainable products and processes has become critical for achieving economic growth in the face of growing environmental pressures.

Innovations to meet these national goals, in turn, often stimulate new ideas and technologies that have broader applications.

Some people argue that it is impossible to return to the postwar US dominance in technology and that leadership in technology is not a realistic goal. We believe, however, that any goal of less than technological leadership is unacceptable and, indeed, guarantees failure. Although a country cannot be a net exporter of everything, it should strive to make the best products and be the most efficient producer in every industry in which it participates. As a large and diverse economy, the United States should participate in virtually all leading industries. This requires across-the-board strength in technology.

II. The Need for A Technology Strategy

To achieve the goal of leadership in the development and application of technology, we need to put in place a strategy that mobilizes the nation's technical strengths and capabilities to build an integrated national technology base that serves defense, civil, and commercial goals.

The strategy must be jointly developed and implemented by industry, government, universities, and labor, since each sector controls some of the factors that impact US technology leadership. The private sector is primarily responsible for the development of commercial technologies; individual firms control the way they manage technology, as well as the extent to which they invest in and seek out technologies that fit with their long term strategic plans. Government is responsible for supporting R&D with high social returns that individual firms cannot or will not fund by themselves, and through federal laws and regulations, it also creates the economic and legal environment that shapes the activities of individual firms.

In addition, government is largely responsible for maintaining the country's infrastructure, which is essential for effective technology development and application. There are also other key contributors to this infrastructure, including private sector investment in R&D, facilities and manufacturing, and the efforts of labor to organize and maintain a highly skilled workforce. Finally, the research and education decisions made in schools and universities significantly impact the long term US position in technology. Fundamental research within universities lays the foundation for future technology developments and helps determine the viability of the nation's scientists and engineers.

This complex network of roles, responsibilities and capabilities demands that firms, universities and labor organizations become active partners in planning, funding and implementing national programs and policies for US technology leadership. A national technology strategy cannot be wholly effective without this high degree of coordination and cooperation.

Background

Until recently, the US did not need a technology strategy for competitiveness. For most of the past 50 years, technology has been an unquestioned American strength.[5] US industry was the leader in virtually all key areas of civilian technology and was not seriously challenged in any technology intensive commercial industries. To the extent that there was competition in technology, it was with the Soviet Union in military technology.

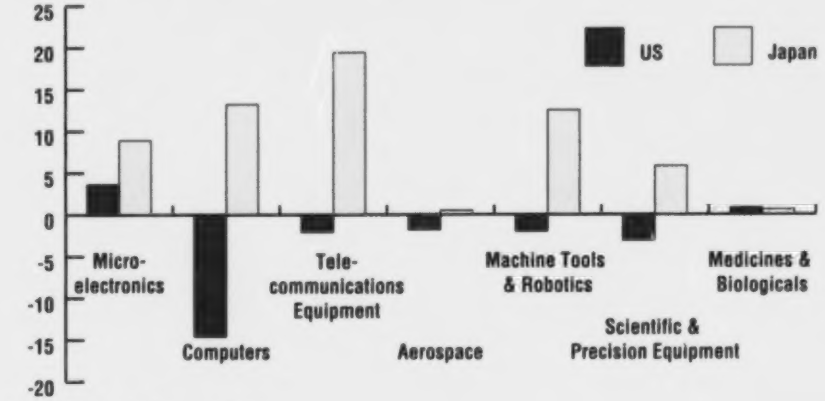
During this period, the US had a national science policy and a strategy for leadership in defense technology. Strong support for basic research and for technology development to meet the mission needs of federal agencies, especially defense, provided enough indirect benefits to keep US industry on the forefront of technology. Basic research supplied industry with new ideas and highly trained scientists and engineers, while the development and procurement of defense technologies provided an initial demand for leading edge technologies and helped establish new industrial sectors. No special policies were intended, or needed, to explicitly facilitate civilian technology development and commercialization.

This system was effective in the 1950s and 1960s for several reasons. US companies were far ahead of their international rivals, many of whom were recovering from the devastation of World War II, and the economy of that time was largely a national economy. As a result, US companies were in the best position to capture the benefits of federally funded basic research and spinoffs from defense and other government missions. Government procurement and federally funded R&D for health and defense are widely credited with spawning and giving US industry a large lead in computers, biotechnology, advanced materials, semiconductors and aerospace. In addition, support for basic research and the training of scientists and engineers contributed greatly to US strength in the chemical and pharmaceutical industries.

In recent years, however, other countries have substantially caught up with, and in some cases surpassed, the United States in technology. US industry's share of both domestic and global markets has dramatically decreased in many high technology industries (see Figure 1), including machine tools, semiconductors and computers.[6] Study after study show that in many key technologies, US leadership has declined or has been lost.[7] Although the United States has strong technical capabilities, and still leads the world in creating new knowledge, in many industries we lag in applying this technology and quickly getting high quality, low cost products to the marketplace. Studies indicate that while the US still leads in overall manufacturing productivity by some measures, we fall behind in machinery, electrical engineering and transport equipment — three technology intensive sectors that are essential for trade, national security, and economic growth.[8]

Figure 1

Percent Change in Share of Global Exports for Select High Tech Industries (1980-1989)



SOURCE: CIA Handbook of Economic Statistics

There are several reasons why the policies that functioned well in the 1950s and 1960s are no longer as effective. First, we have many more competitors than we had following World War II. In addition, those competitors have become much more capable. It was natural and even desirable that foreign competitors would recover from the war and would develop their own R&D capabilities in commercial technology. In the early 1960s, the United States invested nearly twice as much in R&D as a percentage of gross domestic product (GDP) than either Japan or Germany, but by the late 1980s both countries had surpassed the United States. In non-defense R&D, Japan and Germany spent 50 percent more as a percentage of GDP in 1988.[9]

Second, the needs of the defense and civilian markets have diverged and there is widespread agreement that spinoffs from the defense sector provide less commercial benefit than they did in the 1950s and 1960s. For example, while defense procurement used to drive the semiconductor market, today's microprocessors and memory chips are driven by the commercial markets, especially consumer products. In contrast to the past, military systems often use components that are exceedingly specialized and several generations behind.

Third, other nations have not only spent more on R&D, but have developed better capabilities for commercializing technology. They have developed manufacturing systems that are more flexible and efficient, training systems that produce a more highly skilled workforce, and economic systems that enable industry to finance long-term investments. In short, our competitors have become skilled at generating and applying their own advances in technology, while capturing the benefits of US R&D and speeding its application in industry.

In retrospect, US postwar policy, with its focus on science and defense technology, contained only some of the elements necessary for an effective innovation system, but its gaps in generic industrial R&D and support for commercialization and diffusion were masked by our overwhelming lead over foreign competitors. Now Europe and Japan have recovered economically and our relative weaknesses are increasingly apparent.

US policy and industry practices have begun to respond to the changing international environment. Companies are focusing more and more on manufacturing quality and on getting technology to the market quickly. In 1990, the Bush Administration issued a first ever US Technology Policy and both the Administration and the Congress have supported increases in civilian applied technology programs such as the Advanced Technology Program. Antitrust law was modified through the National Cooperative Research Act in 1984 to permit greater industry cooperation in R&D, and the Federal Technology Transfer Act of 1986 established a framework for Cooperative Research and Development Agreements between industry and government researchers.

There are indications that these changes are beginning to have a positive effect. The US high technology trade balance has begun to recover from its all time low in 1986.[10] In addition, US semiconductors makers appear to have reversed their long slide in market share.

For the most part, however, the improvements in private sector performance have been spotty and inconsistent. Many companies continue to underinvest in R&D and training and underemphasize the importance of manufacturing and quality. Change in government policy has also been too little, too slow, and too uncoordinated to have an across-the-board impact on industrial competitiveness. Cooperation between the Administration and the Congress has been limited, often resulting in Congressional initiatives that were opposed by the Administration, or Administration initiatives that were not fully funded by the Congress.

We can do much better. With the end of the Cold War there is an unprecedented opportunity to rethink our approach to technology and forge a new national strategy that mobilizes the technological capabilities and great strengths of the US towards priorities of economic competition and gets industry, academia, labor, and government working together to enhance the contribution of technology to the national welfare.

Strategic Objectives

We have identified six strategic objectives to guide our national technology strategy. They are as follows:

▶ ***Lead in technologies critical to economic competitiveness in the 21st century.*** Research, development, and commercialization of promising technologies are critical to creating new industries and improving the productivity in existing industries. Although the US may not be able to achieve its dominance of previous decades, leadership in each key area of technology must be the goal. Any lesser goal guarantees failure.

▶ ***Make technology policy a national focus and an integral part of the country's economic policy.*** Technology policy must be given higher priority and be jointly developed and managed with economic policy to achieve leadership in technology and to enhance the contribution of technology to the national welfare.

▶ ***Improve the ability of US industry to absorb and commercialize technology.*** The US is the world leader in basic research but must more fully profit from its inventions and from knowledge generated in other parts of the world. Today, technical information flows quickly across national boundaries, and it is the ability to apply technical knowledge that generates benefits. Industry must improve its ability to absorb and commercialize technology, and US technology policy needs to focus on factors that affect industry's ability to do so.

▶ ***Bring industry, labor, federal and state governments, and academia together to improve the contribution of technology to the national welfare.*** To improve US performance in the development and application of technology requires more effective use of the nation's technical institutions and resources. US technology strategy must help US institutions overcome their historical aversion to cooperation and support joint programs and plans that use the resources and capabilities of each sector to improve technological and economic performance.

▶ ***Maintain and build upon the national technology base of facilities, institutions, and human resources.*** A strong domestic technology base of human resources, technically capable small manufacturing companies, research and testing facilities, and human and electronic networks will help US industry develop and apply technologies. Enhancing these capabilities is essential to making the United States a more attractive place to conduct R&D and high wage manufacturing.

▶ ***Enhance US access to international science and technology and ensure equitable cooperation.*** The US has much to gain from improving access to worldwide sources of technology and establishing more equitable financing of large international science and engineering projects. This will require measures to assure that the US is given equal treatment by other nations. In addition, it will require that the government, universities and private sector significantly strengthen their ability to structure international projects that meet US interests.

III. Discussion and Recommendations

The remainder of this report will focus on the recommendations needed to achieve the strategic objectives highlighted above. Collectively, these recommendations make up the national technology strategy. They are presented in four major categories:

1. Increasing national investment in civilian and dual-use R&D in areas critical to competitiveness.
2. Promoting commercialization of technology in capital intensive areas of long-term strategic importance.
3. Creating a world class technology base of human resources, manufacturing capabilities, experimental facilities, and networks.
4. Organizing US institutions for results.

A background discussion of each major recommendation is presented below, followed in each case by specific actions that should be taken to assure effective implementation. The changes in funding required for these recommendations are summarized in the Technology Reform Budget presented in the final section of the report.

1. Increasing National Investment in Civilian and Dual-Use R&D

US investment in civilian R&D, which is generally acknowledged as contributing the most to economic competitiveness, is currently far below that of its leading foreign competitors. In 1989, the nation as a whole invested only 1.9 percent of GDP on non-defense R&D, as compared to 3.0 percent in Japan and 2.8 percent West Germany (see Figure 2).[11] In terms of federally funded R&D, in 1988 only 0.2 percent of government R&D funds were intended to promote industrial development, compared with percentages ranging from 4 to 20 percent in other industrialized countries.[12] This is because the majority of US federal funding is directed towards basic research, defense, and specialized agency missions. Even in technology areas where government and industry needs coincide, cooperation is limited, partly due to a traditional mistrust between government and industry, and also because promoting industrial competitiveness has not been an explicit mission of government agencies (with the exception of the National Institute of Standards and Technology [NIST]).

Public policy should aim to redirect federal R&D capabilities towards industrial needs and ensure that national investment in civilian and dual-use R&D, as a percentage of GDP, is competitive with that of other leading industrial nations. This may be accomplished in a number of different ways, including: (a) using financial incentives to stimulate private sector R&D; (b) increasing government support for civilian and dual-use R&D with technical resources made available through defense reductions; and (c) focusing federal R&D in the areas that are most critical for improved economic performance.

A. Stimulating Private Sector R&D

Industry-funded R&D, which most accurately reflects the needs of the private sector, is significantly lower as a percentage of GDP than that of any of our major competitors (see

Figure 3). Although investment decisions made at the firm level are largely beyond the control of government, public policy can help create a favorable investment climate and provide incentives, such as tax credits, to increase the level of R&D financed by the private sector. Federal policies to stimulate private R&D are frequently justified on the basis that private R&D creates spillovers to other firms and consumers. We believe that in addition to general incentives for private R&D, additional targeted incentives are justified in areas where the spillovers to society are particularly large, such as industry sponsored academic research and precompetitive R&D consortia.

Recommendations

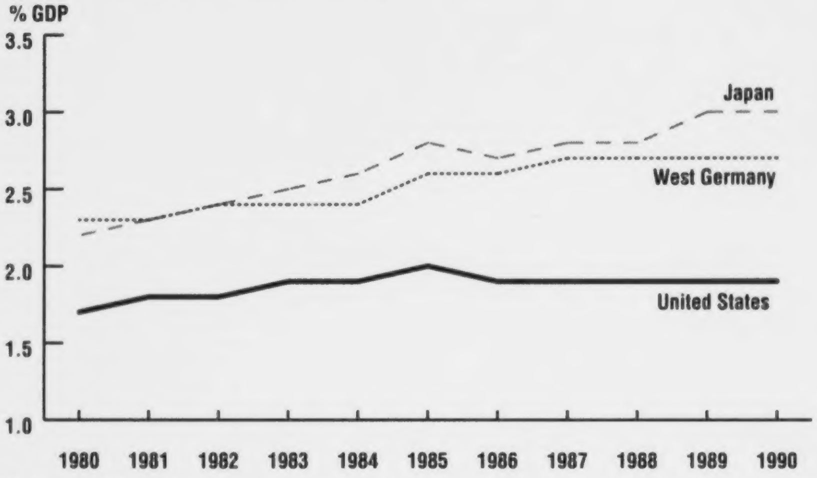
▶ ***Make the incremental R&D tax credit permanent.*** The R&D tax credit should be made permanent so companies can depend on it on a long-term basis and incorporate it into their strategic plans.

▶ ***Extend the credit to include process R&D on existing products.*** The R&D tax credit has previously included R&D on processes before the first article of production, but not R&D on improved processes for existing products. This is essential since continuous engineering of products and processes is as important to competitiveness as technological breakthroughs.

▶ ***Establish an additional 25 percent tax credit for industry sponsored academic R&D.*** The benefits of academic research are likely to be quite broad. The research results are typically disseminated widely and the benefits do not accrue only to the original investor. In addition, students are educated in the process of doing the research.

Figure 2

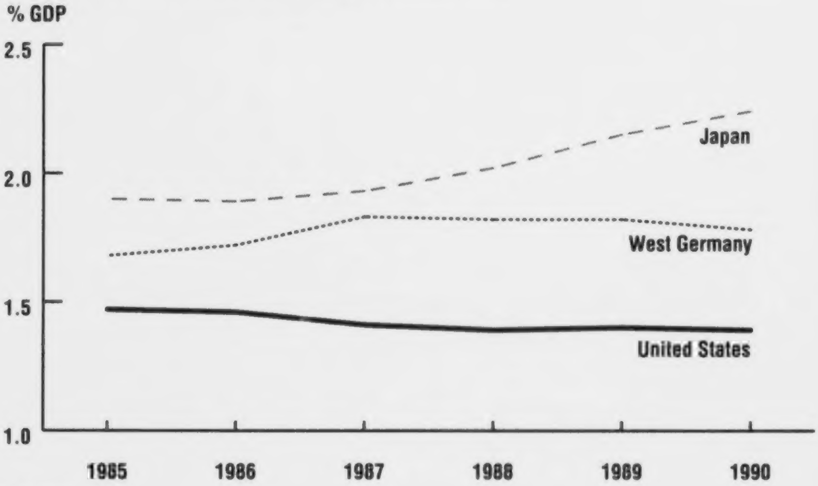
International Comparison of Non-Defense R&D



SOURCE: National Science Board

Figure 3

International Comparison of Industry-Funded R&D



SOURCE: OECD

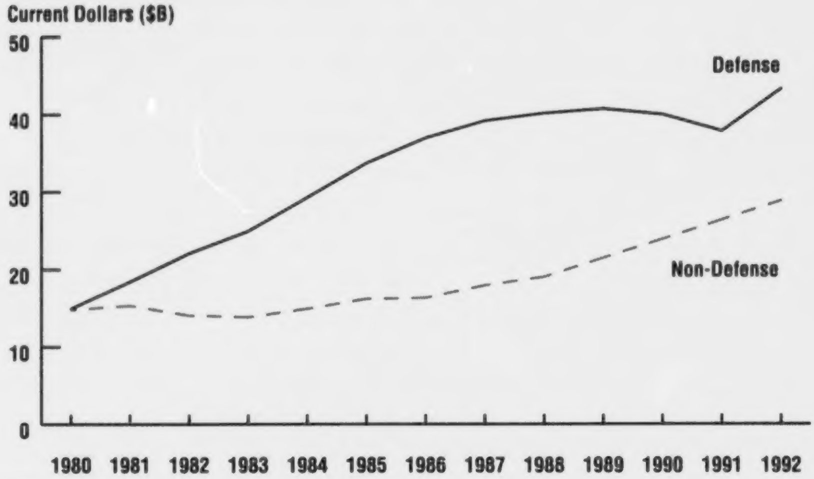
This credit will also help build stronger industry-university linkages.

▶ ***Establish a 10 percent tax credit for the first two years of new R&D consortia, limited to those registered under the National Cooperative Research Act (NCRA) of 1984.*** This tax credit will help overcome industry's cultural resistance to consortia due to historical antitrust barriers.

B. Using Technical Resources From Defense Reductions to Build Civilian and Dual-Use R&D

For the past decade, the majority of government R&D has been allocated towards defense needs (see Figure 4). The end of the cold war offers an opportunity to reallocate government R&D towards new priorities of economic competition. Defense reductions, including planned cancellations of major defense systems, will free up significant resources which may be applied to the development of civilian and dual-use technologies. With these reductions, long range defense research and exploratory development (6.1, 6.2, and 6.3 in defense terminology) should be kept strong. R&D in these categories is necessary to maintain leadership in defense technology and is the part of defense R&D most likely to benefit the civilian economy. Moreover, because commercial industry now leads in many technologies critical to defense applications, greater funding of civilian applied R&D should also help sustain strong defense capabilities. However, for defense needs to be met, substantially increased efforts are needed to integrate the defense and industrial technology bases.[13]

Figure 4
Federal R&D Funding



SOURCE: National Science Board, Science and Engineering Indicators, 1991

Recommendations

▶ ***Maintain US government R&D at least at present levels while shifting resources from defense to civilian goals.*** As a first step, balance federal support for defense and civilian R&D by shifting $7.2 billion from defense production and R&D to priority civilian and dual-use research and technology programs (see the Technology Reform Budget in Section IV below).

C. Focusing Federal R&D to Improve Economic Performance

The area of R&D that needs the most attention by the federal government is the area that falls between basic research and product development. This area is sometimes referred to as precompetitive or generic R&D and includes R&D to improve manufacturing processes to provide for higher productivity and quality, and investment in pathbreaking technologies that create new industries and strategic technologies that are essential for continued competitiveness of existing industries.[14]

Much R&D in this area is beyond the capability and affordability of individual firms and falls between the traditional roles of industry, academia, and government. As a result, cooperative programs that involve joint funding and sharing of facilities, equipment and expertise between industry, government and universities are necessary to fill this gap. Industrial participation will help ensure that the R&D is relevant to industry needs and is disciplined by market forces.

In order to make programs in these areas wholly effective, cultural changes are necessary in industry, government, and universities. The private sector needs to eliminate the "not-invented-here" syndrome that plagues many companies. In addition, companies need to develop ways to use cooperative projects in support of their own strategic goals. Government agencies need to recognize industrial competitiveness as a national mission, as well as acknowledge industry-government cooperation as a valuable means of achieving agency mission objectives. In most areas, whether improving health care, education, transportation, energy efficiency, national security, or the environment, government missions can be accomplished more effectively through close cooperation with the private sector.

Universities, which serve as a key research arm for industry and government, must view R&D with industrial applications as equally deserving of their research and teaching efforts as the more traditional science and engineering disciplines. Manufacturing, management of technology, quality, and design, are areas of high national need that also pose exciting intellectual challenges. Both research and education can be made more relevant to industry and more rewarding to students and faculty with stronger links to these areas. Government sponsored academic R&D should give priority to fundamental research and education, and should strive not only to create knowledge, but also to diffuse knowledge throughout the science and technology enterprise.

During the past decade, several federal programs have been established to support the technology needs of industry, including the Advanced Technology Program (ATP) in NIST, and the National Science Foundation's (NSF) Engineering Research Centers (ERCs) and Industry-University Cooperative R&D Centers (I/UCRCs). In addition, legislation, such as that authorizing industry-government Cooperative R&D Agreements (CRADAs), has established a framework for cooperation between industry and the national labs. Cultural barriers, however, still serve as a barrier to much effective cooperation. The recommendations outlined below will increase R&D in these priority areas while helping to build a new culture of cooperation.

Recommendations

▶ ***Expand the Advanced Technology Program in the Department of Commerce to $750 million/year in five years.*** The ATP has established a credible competitive process for supporting precompetitive, cost-shared industrial R&D. The number and quality of applications indicate additional funding could be well spent. As is currently the practice, this program should support consortia.

▶ ***Increase the number of NSF ERCs to 100, and continue to support NSF's I/UCRCs.*** These centers are vital to building industry-university cooperation and to encouraging a systems approach to engineering problems.

▶ ***Strengthen NIST Intramural R&D.*** NIST core measurement science programs are important to industry and NIST has a good record in working cooperatively with industry.

▶ ***Increase funding and private sector participation in the Federal Coordinating Council for Engineering, Science and Technology (FCCSET) technology initiatives.*** The current initiatives in High Performance Computing and Communications, Advanced Materials and Processing, and Biotechnology, and the pending initiative in Advanced Manufacturing, are first efforts to coordinate and improve federal R&D in critical areas of technology. Increases should go to areas of highest need identified by the private sector.

▶ ***Reallocate, as a start, 10 percent of the R&D of the Department of Energy (DOE) and the National Aeronautics and Space Agency (NASA) labs to support jointly planned and funded industry/government R&D.***[15] This amount should be increased to 20 percent in three years. Metrics should be establish to evaluate the effectiveness of industry-laboratory cooperation, and if results are insufficient, funds should be redirected. Concurrently, federal labs should continue efforts to establish model CRADAs that facilitate industry/lab cooperation, and give directors of government-owned contractor-operated laboratories authority to negotiate, sign, execute, and fund cooperative R&D ventures with industry.

▶ ***Increase support for National Institutes of Health (NIH) cooperative programs with industry***. R&D that will facilitate the commercialization of new drugs and medical devices, such as R&D on methods of evaluating clinical trials, is of particular importance to the private sector. NIH should seek more private sector input from industry in setting its priorities.

▶ ***Increase support for the Defense Advanced Research Projects Agency (DARPA) dual-use technology development.*** DARPA has an outstanding track record for developing technologies that are important to both civilian and defense sectors, and should be kept strong even as defense budgets decline.

2. Promoting Commercialization of Strategic Technology

As has been documented in many previous studies,[16] commercialization is a key weak link in the US technology enterprise. The US is a source of many inventions, but other nations often lead in apply new technologies to commercial advantage. Computer memory chips and robotics are prime examples of US-invented technologies that are now dominated by foreign competitors.

There is substantial evidence that US industry underinvests in many activities which are essential for effective commercialization of technology. As mentioned before, US industry spends less on R&D as a percentage of GDP than Japan and Germany, and invests less in workforce training. In addition, US investment in plant and equipment, which is essential to applying R&D, is now only half of Japanese investment as a share of GDP (see Figure 5).[17]

Commercialization problems plague both large and small companies. Many large companies invest less than foreign competitors in continuous improvement of their core technologies, thus jeopardizing future competitiveness.[18] Entrepreneurs and small companies with exciting new technologies often have trouble obtaining the financing needed to commercialize products and grow their business, and frequently end up licensing their technology to more patient and deep-pocketed foreign companies.[19]

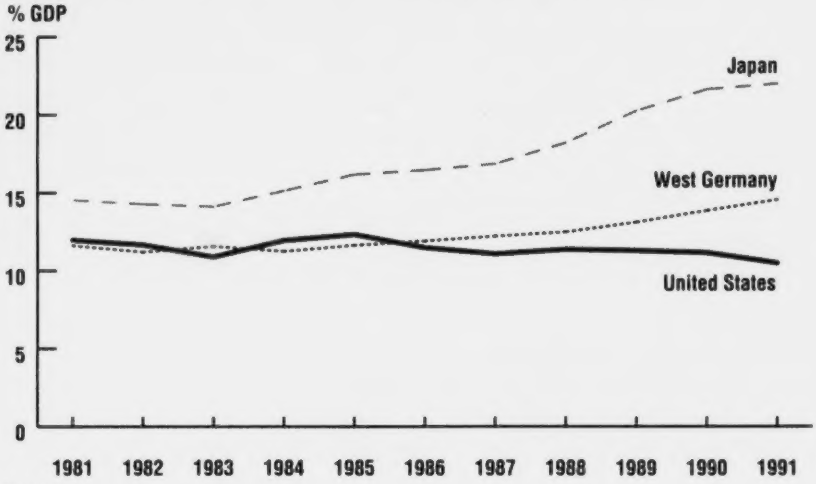
There has been widespread agreement on the seriousness of the problems, but little consensus regarding the appropriate solutions. There are several reasons why the solutions are elusive. First, applying technology for commercial advantage is primarily the responsibility of individual firms and is largely under their control. Firms differ considerably in their ability to pull technology from their laboratories or other sources and apply it to new products or processes, and there is much firms can do to improve this process.[20] Federal influence on these activities is only indirect.

Second, many of the causes of US underinvestment relative to its competitors may be attributed to the macroeconomic environment or to fundamental differences in the capital allocation systems of the US and its competitors.[21]

Third, the problems are not uniform across all of industry. Some industries, such as pharmaceuticals and aerospace, invest as much as or more than their competitors, while many electronics and manufacturing industries invest less. There are important differences in industry structure, technological intensity and maturity, intellectual property protection, and the impact of government policies and programs across industries that affect their ability to invest and succeed in technology.[22] Innovation in the pharmaceutical industry, for example, where there is strong intellectual property protection and where government basic research, drug regulation and drug purchasing policies strongly influence drug development, is quite different from innovation in the machine tool

Figure 5

International Comparison of Investment in Plant and Equipment



SOURCE: OECD

industry, which has none of these characteristics. Weak industry-government cooperation and the low priority given to federal assessment of US industrial competitiveness have also hindered the development of effective sector-specific policies.

Finally, the history of US government involvement in aiding the commercialization of technology has been mixed. On the one hand, there have been notable successes, such as in agriculture or in defense support of computer, semiconductor, and aerospace technologies. On the other hand, there have been notable failures in synthetic fuels, nuclear breeder reactors, and supersonic transports.[23] The threat of political pressure either pushing funds toward weak projects or making it impossible to kill bad projects is quite real.

As government support moves toward commercialization, it is hard to avoid making choices that will benefit a particular firm, technology, or industry over others and there are no irrefutable ways to decide which areas and projects warrant government investment and which do not. For this reason, the Subcouncil firmly believes that government support should focus first and foremost on the infrastructure of technology (institutions, facilities, education, etc.), then on widely applicable technologies, and finally on strategic industries. Government should avoid policies and programs that target individual firms.

In view of these complexities, there is no single mechanism that will address all aspects of the commercialization problem. There are several ways, however, that the federal government can encourage private investment in technology. Investments can be made more attractive by increasing the reward, such as through improved intellectual property protection or the opening of foreign markets. They can also be made more attractive through lowering both the technical and market risk, or by lowering the cost of financing.

A. Lowering Technical Risk

Technical risk can be reduced through federal support for research, development, testing, or demonstration of technologies. Many of the actions recommended in the previous section, such as increasing government-industry cooperative R&D and R&D tax credits, will help lower technical risk to industry. In addition, particularly where the technology is to support a government mission, it may be appropriate for the government to take the R&D to the demonstration stage to reduce the risk and facilitate commercialization. Current and future cross-agency technology initiatives, such as the Advanced Materials and Processing Program and the forthcoming initiative on Advanced Manufacturing, should, in addition to their current focus on R&D, develop plans that address the commercialization of technology.

In areas where there are strong mutual interests, joint industry/

government projects can be a useful mechanism for developing and demonstrating technologies. The history of previous projects, however, suggests the following guidelines:

▶ Projects should be developed with private sector participation and cost sharing to ensure industry relevance.

▶ Projects should have clear goals, a definitive time frame, and mutually agreed upon criteria for success.

▶ Projects should be reviewed periodically, and reauthorized or canceled depending on their progress.

In addition, whenever possible, government/industry projects should be designed as the initial stage of an evolutionary development program that calls for increased private leadership and investment as the program matures. This will help prevent resources from being wasted on stand-alone demonstration projects that lack a long-term strategic vision and adequate commercial potential or on programs that are too narrow to serve the nation as a whole.

Cooperation among firms can also reduce the risk born by individual companies. Industry's use of R&D consortia has greatly increased since the National Cooperative Research Act of 1984 reduced antitrust barriers to cooperative R&D. The Subcouncil supports further efforts to expand cooperative R&D through the R&D tax credits described in the previous section, and through direct government funding of R&D consortia, such as SEMATECH or the Advanced Battery Consortium.

In addition to cooperative R&D, collaboration in manufacturing will be increasingly necessary in some capital intensive industries as high costs and long lead times make development of new manufacturing facilities prohibitively expensive and risky for individual firms. Joint manufacturing ventures are currently not provided any antitrust exemption under the NCRA.

Recommendations

▶ ***Establish government-industry-university pilot development and demonstration projects in technology areas of mutual benefit.*** Examples where joint projects both help achieve government missions and can support technology commercialization include:

- *Communications and Networking.* An expanded version of the Administration's High Performance Computing and Communications Initiative (HPCCI), could provide the foundation for a new national communications infrastructure to meet a wide variety of social and economic needs, including improved delivery of health care and services; increased educational opportunities; and greater access to public and private databases. These networks can improve the transmission of scientific and technical information and information necessary for companies to work together in design and manufacturing. The creation of this infrastructure would also open up or expand the market for many technologies. The Computer Systems Policy Project's (CSPP) proposed national information infrastructure program is a good model for similar government/private sector initiatives in other areas.
- *Environmental Technologies.* Virtually all manufacturing industries are striving to develop processes that minimize pollution and environmentally benign products. The development and demonstration of environmentally conscious manufacturing has the potential to greatly reduce the cost of meeting environmental requirements while simultaneously improving competitiveness and helping companies position themselves to take advantage of growing markets for environmentally conscious products.
- *More Efficient Transportation Systems.* The federal government, working with the states and industry, can encourage the use of advanced technologies to improve the efficiency of transportation systems. Examples include intelligent vehicle/highway systems (IVHS) and high speed rail. The federal role is to fund research and to stimulate the development of a strategic plan that will allow different groups to work together and will allow the systems to

evolve in ways that will contribute to transportation safety, economy, and capacity.

▶ ***Extend the provisions of the National Cooperative Research Act to provide limited antitrust exemption for US-based joint production ventures.*** Expanding NCRA to eliminate the threat of treble damages to joint production consortia would encourage cooperative industrial investment in these areas.

B. Reducing Market Risk

The government can also promote commercialization by reducing the market risk for goods using leading edge technologies. Many of the areas where the United States has had world leadership, such as electronics, medical devices, and pharmaceuticals, are those in which the federal government has both funded R&D and stimulated the market for the technology.

Defense has historically been the primary driver of government funded R&D and procurement of new technologies. Although the role of defense is declining, the government still has many opportunities to be a smart "first customer" of commercial technologies through purchases for internal use, government missions and national infrastructure projects. This government "pull" can serve as a catalyst for industrial commercialization by testing and demonstrating leading edge technologies and by helping industry gain the experience needed for scale-up and manufacturing of commercial products. The government can also promote the development and dissemination of standards that will help reduce uncertainty and help markets to grow, and establish federal regulations which provide markets for critical leading edge technologies, particularly in environmental areas.

Many of the joint projects presented in the previous section work to expand markets for new technologies in their targeted areas. The following recommendations will help federal procurement stimulate markets for leading edge technologies in many other areas.

Recommendations

▶ ***Modify procurement regulations for agency purchases or agency contracted development to give priority to commercial specifications and products.*** For example, harmonize military specifications with civilian specifications and simplify government accounting requirements.[24]

▶ ***Evaluate selection criteria for bids to minimize life-cycle cost rather than acquisition cost.*** This should include public costs associated with environmental impacts of end of life disposal, process wastes, and costs to public health and safety.

▶ ***Base government procurement on performance standards and allow competitive awards to be made to the most cost effective realization of stated performance objectives.*** This will encourage innovation and reduce cost.

▶ ***Experiment with agency procurement budgets to allow them to flexibly procure leading edge technologies.*** A modest percentage of each agency's procurement budget should be exempt from many procurement regulations for the purpose of demonstrating innovative technology.

C. Lowering the Cost of Financing

Finally, the government can lower the cost of financing for technology projects, either through general mechanisms, such as R&D or equipment tax credits, or through more targeted mechanisms such as low cost loans or equity investments in specific projects. As described in previous sections, the Subcouncil supports several general mechanisms to lower the cost of financing technology projects. The appeal of the more targeted mechanisms is that they can potentially have a much larger impact in specific areas at a lower cost than the general mechanisms.

The Subcouncil reviewed several existing proposals to finance technology, most notably the Civilian Technology Corporation (CTC) proposed by the National Academy of Science.[25] This would be a quasi-governmental corporation intended to fund "pre-commercial R&D." Although this proposal has merit, the Subcouncil believes that the more serious problem is downstream of pre-commercial R&D—in the investments needed to take the R&D

to the market. In addition, the recently established and growing Advanced Technology Program in NIST could evolve into an adequate mechanism for supporting pre-commercial R&D. It also presents fewer organizational issues than would creating a new quasi-governmental corporation.

To focus specifically on financing the commercialization of promising technologies, the Subcouncil considered several other alternatives. The goal is to support projects that have large public benefits but are not attractive for private investors because of low returns. Two criteria that guided the Subcouncil were that government mechanisms to support commercialization should not (a) displace investments that private markets would otherwise fund, or (b) subsidize projects with low public and private returns that private markets would correctly reject.

The Subcouncil considered two approaches to solve these problems. One approach is to give selected technology agencies the authority to participate in the commercialization of some of their R&D projects. In a similar manner, the current Small Business Innovative Research (SBIR) program can be extended to include an additional phase for commercialization. There are a number of advantages to this approach. First, the work would already be within the federal agency's mission, justifying continued federal support. In addition, the agencies are knowledgeable about the technological opportunities and the progress made in their R&D efforts, putting them in a good position to select the most promising technologies for commercialization. Finally, some agencies, such as DARPA, have demonstrated competence in facilitating the commercialization of technologies. Other agencies would need to build business expertise in their in-house staff, or rely on advice from outside experts in order to effectively manage these programs.

The second approach is to set up a mechanism that operates through private markets to lower financing costs. For example, the government could establish a Technology Bank to support industry commercialization of technology in capital intensive, high risk areas. Such a bank would work through existing financial institutions to share in the equity, loan, or loan guarantee financing for testing, demonstrations, systems integration and scale-up. This idea merits further exploration. The US should continue to investigate this and other approaches for filling the void for capital in the transition from R&D through the early stages of the commercialization process.

Recommendations

▶ ***Authorize DARPA, ATP, and NIH to purchase equity or extend loans/loan guarantees to help support commercialization of promising technologies developed through their R&D contracts.*** In addition to the payback on loans, the federal government should have a modest financial interest in the future of the project.

▶ ***Add an additional phase to the SBIR program to provide loans for commercialization.*** In addition to the current grants for R&D, an additional phase of the SBIR program could facilitate the commercialization of promising technologies.

3. Creating A World Class Technology Base

Today, many elements of technology flow easily across national boundaries and the capacity for a nation to quickly absorb and disseminate technology is a key contributor to a nations' ability to benefit from advances in technology. To ensure that the United States can take advantage of this flow of information, it is essential that (a) there are organizations that can receive and use the technology; e.g. it is important that R&D and high value-added manufacturing takes place in the United States; and (b) that there are effective mechanisms to diffuse the information. This requires that the United States provides a strong technology foundation for these activities, consisting of a highly skilled workforce, research and testing facilities, human and electronic networks, and technically capable manufacturing companies.

A. Strengthening Human Resources

The knowledge, skills and experience of the workforce are at the core of all successful technology development and commercialization. A well-educated labor pool helps the nation attract technology intensive industries that develop technology, provide high wage jobs, and contribute significantly to economic growth and standard of living. The federal government, states, industry, labor, and academia need to join forces to implement a comprehensive national education system that equips the American people with basic skills, offers extensive opportunities for higher education and provides continuing training to keep the workforce globally competitive.

The US possesses a world class university system, but it has become increasingly evident that our institutions of higher education do not effectively emphasize the most pressing needs of industry, such as process engineering and manufacturing management. NSF's Engineering Education Coalitions represent a start, but additional policies and programs to support core curriculum changes, fellowships for manufacturing engineering, increased internships within industrial production facilities are needed to produce a supply of engineers and scientists that are in tune with current industrial needs and problems.

The US also needs to develop a national apprenticeship program to train non-college bound youth in technical vocations that are relevant to industry. It is imperative that the private sector participate in the development and implementation of this program to ensure that it focuses on skills that are needed by industry.

Workforce training and continuing education is another relatively weak area for the US. Most industrial training programs in the US target professional employees, not the general workforce. When training is provided to these individuals, it is typically job specific instead of built around transferrable skills. Companies are also forced to allocate valuable training resources to remedy failures in K-12 education, including illiteracy and inadequate math and technical skills. Training tax credits, or "pay-or-play" training programs can give industry added incentive to invest in worker training, but to be wholly effective, they must be coupled with programs and policies which ensure that K-12 education produces a competent workforce with basic skills that company training programs can build upon.

Federal and state extension programs can be another mechanism for providing workforce training, but at present, most manufacturing technology assistance programs do not have the resources to effectively take on this responsibility.[26] Integrating industrial extension and training is an especially important goal since modernizing a production facility or service operation with state-of-the-art technologies without providing corresponding worker training programs is not likely to have much of an impact on productivity or competitiveness.

The Education Subcouncil and the Training Subcouncil have developed comprehensive recommendations on education and training. The following recommendations pertain specifically to the jurisdiction of this Subcouncil.

Recommendations

▶ ***Modify undergraduate and graduate education in science and engineering to emphasize process engineering and manufacturing management.*** The National Science Foundation should:

- Fund curriculum development for 20 to 30 graduate programs that combine concepts from engineering and management in the training of future managers. Strong industry involvement should be a qualifying condition for such funds.
- Fund a fellowship program for graduate and post-doctoral scientists and engineers to spend time within industry, university and government labs to reduce cultural barriers and build cooperation.
- Establish a fellowship program to encourage movement of industrial scientists and engineers to academia.

B. Increasing Federal Support for Industry-Relevant R&D Facilities

Experimental facilities and information networks allow leading edge research and development to be conducted in the United States and enable the rapid sharing of technical information. Individual firms generally lack the expertise and financial resources to build and utilize experimental facilities and instrumentation, such as synchrotron light sources, the cold neutron source, high magnetic field laboratories, and computer networks, such as Internet.

Greater emphasis should be placed on increasing industry use of government owned and operated facilities and networks and assuring that industry has easy access to the knowledge, tools and instrumentation it needs to effectively absorb and apply technology. Examples of appropriate programs in this area, besides the facilities and instrumentation mentioned above, include the initiative for a national information infrastructure. Of particular importance are networks that will allow manufacturers to exchange technical information on products and processes.

Recommendations

▶ ***Improve access to existing government-owned facilities and equipment, perhaps by allocating a percentage of their use to the private sector, giving priority to small businesses.***

▶ ***Give priority to establishing information networks for the exchange of technical and manufacturing information.***

C. Strengthening the Manufacturing Base

Technically capable manufacturing companies are an essential part of a strong technology base. Small manufacturers are especially important, since they act as suppliers and subcontractors to larger manufacturers and have been a source of innovation and in the United States. Many small manufacturing firms have been slow to introduce new technologies, improved workforce training, and best manufacturing practices into their organizations.[27] The primary causes are a lack of time, expertise and financing.

Extension services offer a vital opportunity to help small and medium sized manufacturers modernize their organizations and operations. A number of states have extension services, modeled after that of the Department of Agriculture, to help these firms better use new technologies and practices. At the federal level, the National Institute of Standards and Technology now funds seven Manufacturing Technology Centers at various sites around the country with a combined budget of $15 million in FY92. These activities are helpful, yet they are much smaller in scope than similar efforts in Japan (which has 170 prefectural technology centers funded at approximately $500 million per year), Europe, or in agriculture in the United States. Expanding US manufacturing extension programs to give more manufacturing firms easy access to new technologies, testing facilities, quality management and training programs will help improve their competitiveness as well as the competitiveness of their customers. Federal initiatives should build on and support state extension programs.

Recommendations

▶ ***Strengthen and expand federal and state manufacturing extension services to provide comprehensive regional service and achieve national coverage.*** The federal government should provide services and funding of $300 million to build on and support existing state and local extension programs. This amount should be matched by state and local governments.

▶ ***Provide incentives for private sector investment in manufacturing equipment.*** An investment credit for plant and equipment should be established (refer to the Manufacturing Subcouncil Report for details on the credit).

4. Organizing US Institutions for Results

For a US technology strategy to be successful, it must be developed in a cohesive fashion with input from the private sector and the states, and must be executed effectively. This is a difficult challenge because US technology resources and decision-making are dispersed widely throughout the federal government, industry, the states, and universities. Economic, trade, regulatory, and education policies that affect technology development are further dispersed. Improvements are needed in the technology policy-making and execution in the executive branch, in the Congress, and in federal-state coordination.

A. Improving Technology Policy Development and Implementation in the Executive Branch

Technology programs are dispersed throughout a large number of agencies, of which only one, the Department of Commerce, has been promoting competitiveness as a primary mission. The White House Office of Science and Technology Policy (OSTP) has been the focal point for technology policy making in the Executive Branch. The Federal Coordinating Council on Science, Engineering, and Technology (FCCSET), which operates under its auspices, has been the main mechanism for coordinating the technology activities in federal agencies in recent years.

There are several problems with the current executive branch technology policy making and implementation. First, technology policy and economic policy are not well integrated. The OSTP historically has not been a full player in economic policy making, and has had a difficult time holding its own vis-á-vis the Office of Management and Budget and the Council of Economic Advisors. In addition OSTP has largely confined itself to R&D issues, and has not addressed other policy issues that affect the US success in technology, such as economic, regulatory, trade, and procurement policy.

Second, government has had difficulty getting industry experts to fill key science and technology positions,[28] and overall, private sector input into policy making has been limited. Input into OSTP has been largely through the President's Council of Advisers on Science and Technology (PCAST), which has not had enough visibility to be wholly effective. In addition, the Council is too small and has had too broad a scope—addressing issues from arms control to the environment — to provide an adequate input on technology policy and competitiveness. The FCCSET process also lacks input from and continuous discussion with the private sector. Regulations governing industry participation in federal advisory committees and conflict of interest among federal employees also have limited broader industry-government cooperation and interaction in technology policy. As a result, government R&D and technology programs have largely been isolated from industrial needs.

Third, the execution of multi-agency programs has been weak. OSTP through FCCSET has developed interagency initiatives in key areas of technology, including high performance computing and communications, advanced materials and processing, biotechnology, and advanced manufacturing, but in its current form can not effectively implement or managing these programs. Participation in the FCCSET process is voluntary by the agencies, and some agencies are reluctant to participate because they fear losing control over their budget.

Fourth, the ability to match technology policies with an understanding of the needs and capabilities of specific industrial sectors has been weak. The federal government needs a better mechanism to interact with and analyze industry, and a better means of developing international science and technology agreements that benefit US economic interests. It also needs a better mechanism to monitor, analyze, and disseminate technical information from overseas sources. The Technology Administration in the Department of Commerce is an appropriate place for these functions, but has not been funded at an adequate level and has not demonstrated that it can consistently perform first rate independent analysis of industries.

One approach to addressing these problems is to create a new agency or reorganize existing agencies to focus on civilian technology. The history of such major institutional changes, however, suggests that they require much time and political capital, and take years to work effectively. Although we did not rule out the need for such reorganization, we focused more on actions that could be quickly implemented. These include strengthening and shifting the focus of existing organizations, and strengthening the linkages between organizations.

Recommendations

▶ ***Create a White House Council on Science, Technology, and Environmental Policy, to be chaired by the Vice President, to set directions and policy.*** Members should include Secretaries and Agency Heads of the Department of Commerce, the Department of Energy, the Department of Defense, Health and Human Services, the National Science Foundation, the National Aeronautics and Space Agency, the Office of Science and Technology Policy, and the Office of Management and Budget.

▶ ***Strengthen linkages between OSTP and the Council of Economic Advisors.*** Staff from these organizations should work together to develop the broad outlines of a civilian technology policy that is integrated into economic policy.

▶ ***Strengthen OSTP.*** The scope of OSTP should be expanded to include manufacturing. In addition, the FCCSET planning and budget process should be strengthened to give it the authority and capability to manage cross-agency presidential initiatives in a matrix management method.

▶ ***Enlarge PCAST and give it the authority to create subcouncils to get private sector input on detailed technology problems and issues.***

▶ ***Give PCAST responsibility for conducting a joint industry, academic, and government prioritization of the R&D budget.***

▶ ***Strengthen the Technology Administration in the Department of Commerce.*** The Technology Administration should be made the focal point for: (a) analyzing industries and their technological needs; (b) gathering, analyzing, and disseminating US and international technical information; and (c) facilitating domestic and international technological cooperation.

B. Focusing Congress on Technology

Within Congress, the federal R&D budget is handled by many authorizing committees and appropriations subcommittees, making it difficult to establish a cohesive technology strategy or to set priorities among R&D spending. The House Science, Space, and Technology Committee, for example, which has is the broadest authorization jurisdiction on technology issues, lacks jurisdiction over defense and health R&D, which is over two thirds of the R&D budget. In appropriation subcommittees, science and technology programs are not addressed in a cohesive way. The National Science Foundation budget, for example, competes primarily with housing, not other R&D programs, for funds. There is a need to establish a better process in the Congress to make decisions on technology and competitiveness. Although our Subcouncil did not reach any major recommendations on this issue and other groups are examining Congressional organization in more detail, the options recommended on the following page should be considered.

Recommendations

▶ ***Realign appropriation subcommittees to bring more key technology programs under a smaller number of subcommittees.*** This will allow for better coordination of technology programs and make it easier to establish R&D priorities.

▶ ***Establish a process for members of authorizing and appropriation committees to examine the federal R&D budget as a whole to encourage informed trade-offs among competing technology programs.*** A joint committee, or joint hearings between committees are options.

C. Improving Federal-State Coordination

Many key technology activities are funded and performed by the states. States have played a leading role in diffusing technology to small companies, establishing incubators for new technology companies, and developing regional strengths through university research, training programs, and other economic development programs.[29] There is a need for greater federal-state coordination in developing and executing technology policy.

Recommendations

- ***States should work together to identify and coordinate their technology needs.***
- ***States should communicate their needs to the federal government, possibly through the National Governors Association.***
- ***States should work with local industry to determine local technology infrastructure needs.***

IV. The Technology Reform Budget

We believe that the recommendations described above can be implemented through reprioritizing rather than augmenting federal spending on science and technology. This is particularly important given the overall priority of reducing the federal budget deficit. In general, these budget changes try to accomplish the following:

- Balance defense and civilian R&D. A 50 percent split will not shortchange defense and will increase civilian technology programs by approximately $7.2 billion.
- Use the reallocated dollars to fund civilian technology programs that are less than optimally funded.
- Bolster agencies and departments that have responsibility for generic technology critical to economic competitiveness.

Our detailed recommendations are presented in Tables 1, 2 and 3. A brief description of each table is presented below.

Table 1
Technology Reform Budget
(in millions of 1992 dollars)
Overview

	FY92 Base	FY95 Proposed	Change
Defense/Civilian Balance			
Defense R&D	42,700	35,500	-7,200
Civilian R&D	28,300	35,500	7,200
Total	**71,000**	**71,000**	**0**
Priority Enhancement			
Industry-Driven R&D	17880	23130	5250
Commercialization	320	1920	1600
Infrastructure	65	405	340
Organization	9	19	10
Total Change	**18274**	**25474**	**7200**

Table 1
Table 1 presents an overview of the proposed shift in federal funding from defense to civilian technology programs. It also includes the total funding requirements for each of the four major categories of recommendations:

(I) Industry-driven R&D;
(II) Commercialization;
(III) Technology Base; and
(IV) Organization.

All figures are in constant 1992 dollars. "Industry-driven R&D" includes programs that directly support private sector development of technology (e.g., ATP), as well as support for areas where industry needs and agency missions coincide. "Commercialization" consists of policies to encourage government procurement of technology, financing for commercialization, and pilot projects to develop and demonstrate commercially relevant technologies. "The Technology Base" includes programs and policies to strengthen

Table 2
Detailed Budget

	FY92 Base	FY95 Proposed	Change
I. Industry-Driven R&D			
ATP	50	750	700
NIST Intramural	200	400	200
NSF's ERCs	50	300	250
Technology Initiatives:	7280	9780	2500
- Computing	*560*	*1060*	*500*
- AMPP	*1660*	*2160*	*500*
- Biotechnology	*3760*	*4260*	*500*
- Manufacturing	*1300*	*2300*	*1000*
NIH	8900	9900	1000
DARPA	1400	2000	600
Total	**17880**	**23130**	**5250**
II. Commercialization			
Communications & Networking	100	600	500
Environmentally Conscious Manuf.	0	300	300
Transportation	220	520	300
Financing Tech.Commercialization	0	500	500
- DARPA, ATP, NIH			
- SBIR Extension			
Total	**320**	**1920**	**1600**
III. The Technology Base			
Manufacturing Extension	15	320	305
Eng.-Man. Curriculum	50	70	20
Univ-Ind.-Gov. Fellowships	0	15	15
Total	**65**	**405**	**340**
IV. Organization			
OSTP	4	6	2
DOC Tech Admin	5	13	8
Total	**9**	**19**	**10**
TOTAL CHANGE			7200

human resources, support industry relevant facilities and equipment, and provide manufacturing assistance to small and medium-sized companies. Finally, "Organization" consists of the institutional changes required to position the government for effective implementation of a national technology strategy.

Table 2

Table 2 presents a more detailed breakdown of recommendations and programs within each of the four categories. For each program, we indicate the base in FY92, the recommended funding level in FY95, and the total proposed change. Where recommendations correspond to an existing program (e.g., ATP, NSF's ERCs), the FY92 base numbers are directly from federal budget documents. In other cases, the base figures represent our closest estimate. The four sections in table 2 are described in more detail below.

Section I: Industry Driven R&D. Proposed budget increases for NIST, DARPA and NIH represent growth in industry-focused programs, not base programs. The recommendation for a 10-20 percent reallocation of DOE and NASA lab budgets for industry driven R&D does not appear in the table since it does not require any increase in lab funding, only an internal budget shift. The R&D tax credits are also not included in the table, as they are intended to be part of an overall federal tax package. The estimated first year costs of the two new credits for industry-sponsored academic R&D and R&D consortia are as follows:

Academic R&D:
$1 billion/year x 25% = $250 million

R&D Consortia:
$100 million/year x 10% = $10 million

Section II: Commercialization. The budget increases in this category are relatively small in relation to those presented in the previous section. This is true for several reasons. First, many of the proposed increases for Industry-driven R&D and the Technology Base will also, by design, facilitate commercialization. Federally funded R&D that is focused on industry needs is more likely to generate technologies that can be quickly utilized by companies, and a strong technology base will help industry effectively absorb and apply technology. Second, although the proposed FY95 budgets for programs in this area are relatively small, the recommended increases are relatively substantial compared to their initial base. Finally, we are proposing first steps towards direct government financing of industry commercialization (e.g., authorizing agencies to extend loans or loan guarantees for commercialization of technology). Accordingly, the recommended budget for this new program is conservative and reflects its experimental nature.

Table 3
Technology Budget in Current Dollars

	FY92 (FY92 Dollars)	FY95 (FY95 Dollars*)
I. Industry-Driven R&D		
ATP	50	840
NIST Intramural	200	450
NSF's ERCs	50	337
Technology Initiatives:	7280	11001
- Computing	*560*	*1192*
- AMPP	*1660*	*2430*
- Biotechnology	*3760*	*4792*
- Manufacturing	*1300*	*2587*
NIH	8900	11136
DARPA	1400	2250
II. Commercialization		
Communications & Networking	100	675
Environmentally Conscious Manufacturing	0	337
Transportation	220	585
Financing Technology Commercialization	0	562
- DARPA, ATP, NIH		
- SBIR Extension		
III. The Technology Base		
Manufacturing Extension	15	360
Eng.-Man. Curriculum	50	79
Univ-Ind.-Gov. Fellowships	0	17
IV. Organization		
OSTP	4	7
DOC Tech Admin	5	15

* NOTE: *FY95 Dollars Based on a 4 Percent Annual Inflation Rate*

Section III: The Technology Base. The funding changes in this category focus primarily on manufacturing extension and university education. We have also recommended increasing access to government owned facilities. This recommendation requires little funding, but could significantly strengthen the technology base available to industry. Support for a national information infrastructure, which is also an essential part of the Technology Base, appears in section II under the pilot development and demonstration project for Communications and Networking.

Section IV: Organization. The figures in this section represent changes in funding for OSTP and the Technology Administration within DOC. Although these increases are small relative to the three previous sections, the recommendations they support, including management of cross-agency technology programs and increased coordination of technology and economic policy, are crucial for effective execution of a national technology strategy.

Table 3

Table 3 presents the expected funding levels for all recommendations in 1995 dollars, assuming an annual inflation rate of 4 percent.

Notes

1. Technology is often defined as the application of knowledge for useful purposes.

2. Much of the literature on this is summarized in Ralph Landau, "How Competitiveness Can be Achieved," *Technology and Economics* (Washington, DC: National Academy Press, 1991).

3. The National Science Board categorizes the following R&D intensive sectors as "high technology": industrial chemicals (ISIC 351), drugs and medicines (ISIC 3522), engines and turbines (ISIC 3821), office and computing machinery (ISIC 3825), communication equipment (ISIC 3832), aerospace (ISIC 3845), and scientific instruments (ISIC 385). US National Science Board, *Science and Engineering Indicators: 1991* (Washington, DC: National Academy Press, 1991) p. 136.

4. US National Science Board, *op. cit.*, p. 137.

5. For a detailed analysis of factors leading to the postwar American lead in technology, see Richard R. Nelson and Gavin Wright, "The Rise and Fall of American Technology Leadership: The Postwar Era in Historical Perspective," *Journal of Economic Leadership* (Dec. 1992) pp. 1931-1960.

6. The US share of the global market for high-tech manufactures shrank from 40.4 percent in 1980 to 35.9 percent in 1990, while Japan's share grew from 18.3 percent to 29.2 percent over the same period. US National Science Board, *op. cit.*, p. 402.

7. See for example, Council on Competitiveness, *Gaining New Ground: Technology Priorities for America's Future* (Washington, DC: Council on Competitiveness, 1991); US Department of Commerce, Technology Administration, *Emerging Technologies: A Survey of Technical and Economic Opportunities* (Washington, DC: US Government Printing Office, 1990); and Japan Technology Evaluation Center, *JTEC Program Summary* (Baltimore, MD: JTEC, 1991).

8. McKinsey Global Institute, *Service Sector Productivity* (Washington, DC: McKinsey Global Institute, 1992) pp. 7-8.

9. National Science Foundation, *International Science and Technology Data Update: 1991* (Washington, DC: US Government Printing Office, 1991).

10. US National Science Board, *op. cit.*, p. 409.

11. *Ibid.* p. 342.

12. *Ibid.* p. 11.

13. See Center for Strategic and International Studies, *Integrating Commercial and Military Technologies for National Strength: An Agenda for Change* (Washington, DC: Center for Strategic and International Studies, 1991); and Herschel Kantor and Richard H. Van Atta, *Integrating the Defense and Civilian Technology and Industrial Bases: A Necessary Condition for Reconstitution* (Alexandria, VA: Institute for Defense Analyses, Dec. 1992).

14. John Alic et al., *Beyond Spin-off* (Boston: Harvard Business School Press, 1992) pp. 369-371.

15. For more detailed elaboration of this recommendation and the rationale behind it, see Council on Competitiveness, *Industry as a Customer of the Federal Laboratories* (Washington, DC: Council on Competitiveness, 1992).

16. For example, see Council on Competitiveness, *Picking Up the Pace: The Commercial Challenge to American Innovation* (Washington, DC: Council on Competitiveness, 1988); and National Academy of Sciences, *The Government Role in Civilian Technology: Building a New Alliance* (Washington, DC: National Academy Press, 1992).

17. Council on Competitiveness, *Competitiveness Index: 1992* (Washington, DC: Council on Competitiveness, 1992) p. 7.

18. For a detailed discussion of this issue, see Michael Porter, *Capital Choices: Changing the Way America Invests in Industry* (Washington, DC: Council on Competitiveness, 1992).

19. The National Research Council studied 282 case of linkages between US and Japanese companies in biotechnology. Over 90 percent of the technology flow in these linkages was from the US to Japan, and the vast majority of linkages were between small US companies and large Japanese companies. For details see National Research Council, *US-Japan Technology Links Biotechnology: Challenges for the 1990s* (Washington, National Academy Press, 1992).

20. Joseph G. Morone, *Winning in High-Tech Markets: The Role of General Management* (Boston, Harvard Business School Press, in press January 1993).

21. For a detailed discussion of this issue, see Porter, *op. cit.* Two other Competitiveness Policy Council Subcouncils—the Subcouncil on Capital Formation and the Subcouncil on Capital Markets and Corporate Governance—also addressed these issues in more detail.

22. For details see Council on Competitiveness, *Gaining New Ground: Technology Priorities for America's Future*, final report and research papers (Washington, DC: Council on Competitiveness, 1991). This report was based on studies of the technology needs of nine sectors of US industry.

23. For a thorough review of six major commercial R&D programs, see Linda R. Cohen and Roger Noll, *The Technol-*

ogy Pork Barrel (Washington, DC: The Brookings Institution, 1991).

24. A major recent study of this areas was undertaken by the DOD Advisory Panel on Streamlining Acquisition Laws. Their report is pending and is expected to be released in late 1992.

25. National Academy of Sciences, *The Government Role in Civilian Technology: Building a New Alliance* (Washington, DC: National Academy Press, 1992).

26. Philip Shapira, *Modernizing Manufacturing: New Policies to Build Industrial Extension Services* (Washington, DC: Economic Policy Institute, 1990).

27. *Ibid.*

28. For a detailed discussion and recommendations on getting more industry expertise in government, see National Academy of Engineering, *Science and Technology Leadership in American Government: Ensuring the Best Presidential Appointments* (Washington, DC: National Academy Press, 1992).

29. For more detail on this subject, see: Carnegie Commission on Science, Technology, and Government, *Science, Technology, and the States in America's Third Century* (New York: Carnegie Corporation of New York, 1992).

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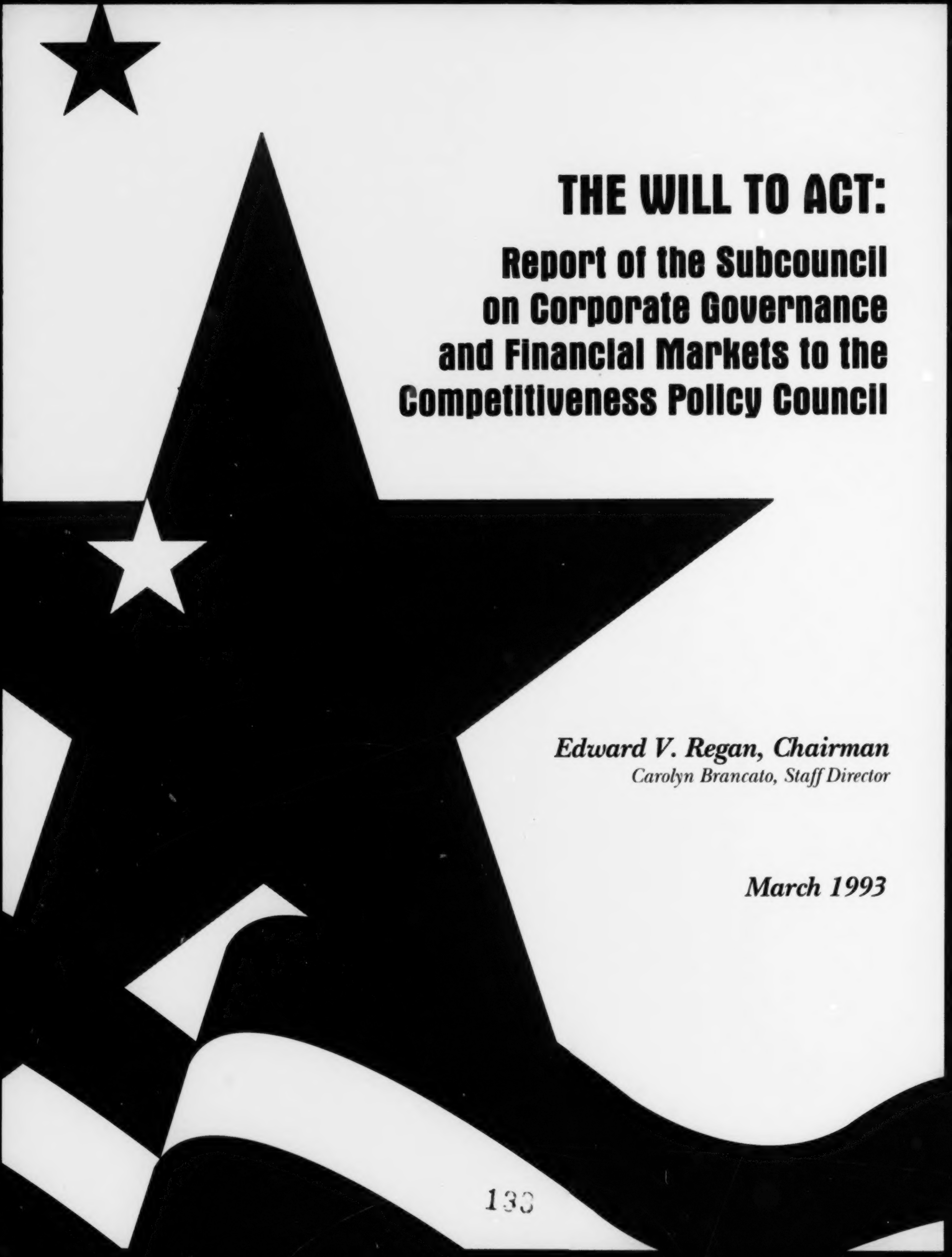

THE WILL TO ACT:

Report of the Subcouncil on Corporate Governance and Financial Markets to the Competitiveness Policy Council

Edward V. Regan, Chairman
Carolyn Brancato, Staff Director

March 1993

Corporate Governance Subcouncil

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COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

C. Fred Bergsten
Chairman, Competitiveness Policy Council
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Washington, DC 20036

Dear Fred:

The Subcouncil on Corporate Governance and Financial Markets was composed of twenty-six prominent individuals from the following: corporate management, public and private pension fund management, the investment and legal community, the labor community, the Chairmen of the Securities and Exchange Commission and the New York Stock Exchange, and academia.

The Subcouncil held three meetings in Philadelphia (June 2nd), Minneapolis (August 5th), and San Francisco (September 24th). In addition to the substantial contributions from the members of the Subcouncil, we heard formal presentations from nineteen experts from industry, government and academia, and received input from CEOs and senior management of seven regional corporations. An extensive review of the relevant literature in the field preceded each meeting. Our conclusions follow.

Many, if not most, American corporations compete well in international and domestic markets. They do so in spite of a constantly shifting macroeconomic landscape. America, however, has too many poorly performing companies.

Our major findings are the following:

- The financial markets, per se, are not the cause of our competitiveness problems. At times, they are used as excuses for poor performance.
- The corporate governance system is not, per se, the cause of our competitiveness problems. Use of improved governance systems is currently bringing about positive change in many corporations. Further improvements in the system are, however, essential.

- The focus must be on long-term corporate performance. Non-financial measures of corporate performance, to supplement financial measures, should be used by corporations to evaluate their performance.
- Boards of directors and shareholders must be informed and active in monitoring corporate performance; they must demonstrate the will to force change.

Sincerely,

Edward V Regan

Edward V. Regan
Chairman, Subcouncil on Corporate Governance and Financial Markets

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I. Introduction

The central questions providing the focus for the Subcouncil's work were:

▶ **Are there any aspects of our financial markets or our corporate governance system that constrain US corporations' ability to realize their strategic plans and to compete in world markets? and,**

▶ **Are there improvements we can make either in our financial market system or our corporate governance system which will enhance our current competitiveness position?**

Competitiveness Problems Facing the Nation

To answer the foregoing, first, we need a clear understanding of the nation's "competitiveness" problem. Two factors are especially relevant.

▶ The Competitiveness Policy Council, in its first annual report, defines "competitiveness" by focusing on four criteria.

First, US goods and services should be of comparable quality and price to those produced abroad. Second, the sale of these goods and services should generate sufficient US economic growth to increase the incomes of all Americans. Third, investment in the labor and capital necessary to produce these goods and services should be financed through national savings so that the nation does not continue to run up large amounts of debt as in the 1980s. Fourth, to remain competitive over the long run, the nation should make adequate provisions to meet all these tests on a continuing basis. [1]

Judging by these standards, America has a competitiveness problem.

▶ A significant number of our members believe that America's competitiveness problems stem primarily from the unstable and volatile macroeconomic environment in which corporations make investment decisions. Key elements of this macroeconomic environment are taxes, inflation, interest rates, exchange rates, and legislative and regulatory policies. Government officials must adopt policies in these areas which are consistent and predictable from year to year, and which will create incentives for savings and for corporations to make long-term investments in their businesses and in the economy.

The following proposals should be reviewed for possible implementation: removal of the bias which favors debt over equity; removal of the double taxation on dividends; enactment of capital gains tax incentives; and enactment of investment tax incentives for R&D and training.[2]

Competitiveness Problems Facing Corporations

Second, we need an understanding of the "competitiveness" problems facing our corporations. Again, two factors are especially relevant.

▶ American corporations' competitiveness problems result from factors other than just the current recessionary cycle. America's international market-share in many key manufacturing industries has been steadily decreasing and, despite the recovery in our exports during the late 1980s, our trade deficit over the entire decade totaled $1 trillion.[3]

▶ Market share, however, doesn't tell the whole story. It is an insufficient gauge of the strategic positioning of companies as well as industries. This strategic positioning is built on a foundation of investment incorporating both tangible and intangible assets. Aggregate rates of investment in property, plant and equipment, civilian R&D and intangible assets such as corporate training and related forms of corporate human resource development are, by a variety of measures, lower in the United States than both Japan and Germany, as well as other major competitors.[4]

II. Findings and Recommendations

1. The "Capital Choices" Argument

The Subcouncil considered in depth the arguments put forth by Professor Michael Porter in his report *Capital Choices: Changing the Way America Invests in Industry*.[5] This report grew out of a joint project by the private sector Council on Competitiveness and the Harvard Business School, and is based on 18 papers written by 25 noted scholars.

Porter argues that the capital investment and allocation process in the United States is flawed, that the German and Japanese processes are superior, and that, consequently, we are at competitive disadvantage and should reform the system.[6] It should be said, at the outset, that many Subcouncil members were not persuaded that we have a pervasive underinvestment or capital allocation problem[7] and did not, in general, find Porter's policy prescriptions persuasive, although most found that changes could be made to improve the tangible and intangible investment environment.

While rejecting facile arguments about "short-term" America, we recognize that US businesses operate in a culture that does not stress physical or institutional preservation. And many top CEOs acknowledge that, while they manage for the long-term, they keep an eye on the short-term too, for they do not want to get on any money manager's quarterly financial "screen."

The capital allocation system and the parties to that system — corporations, public and private pension funds, other institutional investors, etc. — behave rationally. Capital markets are efficient to the extent that they find the best projects and make capital available to them. A key factor in this efficiency is denying capital to those firms that cannot provide long-term returns commensurate with other investment opportunities. This is a source of a great deal of tension between firms and capital markets, and indeed between Wall Street and Main Street.[8]

The National Academy of Engineering identifies "pockets" of underinvestment in which viable longer-term payout projects are not undertaken despite their long-term strategic attractiveness. One such area involves highly targeted industries where technological costs are high, returns are slow to mature (where products may take up to 15 years to bring to the market, for example), and investments are illiquid and intangible for a long time and complex and difficult to evaluate. Other areas may involve retooling or bringing product development to fruition in companies not necessarily in the high technology category.[9]

Even if those macroeconomic policies discussed above were to be altered, our capital markets can, on occasion, operate with "blinders" on which miss, and therefore undervalue, important aspects of investment in things like research and development, education and worker training — the very things that are critical to positioning businesses strategically to compete in world markets and the very things that are difficult if not, in some cases, virtually impossible to capture in current financial measures.

To the extent there is a problem — and again, there were sharp differences of opinion among our members on this subject — there is no one culprit. Investors and managers and all other constituent groups appear to be behaving rationally. They concentrate on the measurements available — financial and economic returns. If some potential investors focus on quarterly and annual financial statements in the belief that this is where a corporation chooses to show its true value, and if the corporation puts its emphasis on timely financial returns, believing this will attract investors, there will, as Porter argues, continue to be a negative, circular, self-reinforcing trend.

This sets an appropriate stage for consideration of our two main questions and for our conclusion — that there needs to be a focus on corporate long-term performance.

2. The Financial Markets

The financial markets are not, per se, the cause of our competitiveness problem.

The Efficiency of the Markets

The Subcouncil finds the US financial market system generally to be superior and functioning efficiently to provide capital throughout needed sectors in the economy. There is no persuasive evidence, contrary to certain popular perceptions, that markets necessarily "punish" corporations that make major, long-term investments. The financial markets have become, to some extent, a "scapegoat" for problems which originate elsewhere.

Believability/Information Gaps

The Subcouncil believes that, by and large, the markets are liquid and efficient and current stock prices, for the most part, reflect a corporation's prospects. Announcements of higher R&D or capital expenditures are almost universally greeted by higher stock prices. [10] Where this is not the case, variances are more likely to be attributable to believability gaps.[11] For example, the reputation and record of the CEO making an investment announcement may be a major determinant of subsequent stock price behavior. Believability or credibility gaps thus occur when management lacks sufficient credibility for stockholders to believe that it can meet its stated goals. Management making a long-term investment then faces a dilemma. If management makes the long-term investment, it could increase corporate value. Yet, if there is a credibility gap, the current value of that investment will not be reflected in the current stock price.[12] On the other hand, many argue that markets, if wrong temporarily, will become self-correcting as management proves itself, as suggested below.

The harder issue is whether there exist "information" gaps (as distinguished from credibility gaps) which lead to underinvestment. We know that sophisticated analysts have access to a remarkable amount of information and firms can attract capital when they have a positive net present value project to finance. But, on a relative competitiveness basis, our appreciation of long-term competitive tangible and intangible investment opportunities is restricted. We need to rethink some of our traditional methods of developing and disseminating information. We should seek to develop and incorporate broader financial and non-financial measures of corporate performance and investment for strategic positioning to overcome this type of information gap.

Derivative Investing, Volatility and Trading

The use of derivative instruments, for indexing and other purposes, does not appear at this time, to have a negative impact either upon corporations' ability to raise capital or upon the corporate investment cycle.

We know that the markets, in all their many facets, incorporate some short-term trading which may be more related to "market timing" considerations than to changes in the perceptions of the fundamental value of a corporation.[13] While corporations are certainly sensitive to price movements in the secondary markets,[14] we find no persuasive evidence that managers and boards of directors impede their longer term large scale investment decisions as a result of these short-term price swings.

At this time, we do not regard turnover in financial markets as "excessive," nor is this "market timing" turnover a significant cause of higher costs of capital and/or short-term corporate investment strategies.[15]

Nevertheless, "spikes" of excess volatility have occurred from time to time. They may produce significant market instabilities, scare investors and, if not contained, could lead to higher costs of capital. If they were to be repeated on any kind of regular basis, they would produce instability, at least in the short-run, which would reduce the short-term viability of our markets and damage our competitive position. Although such excessive volatility spikes do not, at this time, have a significant negative influence on the cost of capital, their occurrences should be continually monitored — including current use of circuit breakers and monitoring of margin requirements, use of derivative instruments, etc. — to insure against increasing our cost of capital and to preserve the critical efficiency and underlying investor confidence in the financial markets.[16]

Despite current anomalies and problems, we conclude that public policies to "throw sand in the gears" of the financial markets and slow down the transactions taking place — by imposing taxes on otherwise tax-exempt institutions or by imposing transactions taxes on short-term stock trading — would harm business financing more than they would help.

3. The Corporate Governance System

Improvements in the corporate governance system in the United States have been taking place in recent years, and, while corporate performance can still benefit from additional improvements in our governance system, the system is not, per se, the cause of our competitiveness problem.

In the last several years we have moved in a typically "American" fashion to refine our system of corporate governance. It has been incremental, episodic and cluttered with irrelevancies and side issues. Yet, there is much evidence that constructive oversight, the ultimate goal of a good governance system, is taking place, on the part of both boards of directors and institutional investors.

Improvements in the Corporate Governance Process by Corporations

Boards of directors have become better organized and appear to be quicker to intervene in cases of poor corporate performance. Independent directors now dominate the membership of boards and key board committees. Audit committees of major companies are composed entirely of independent directors and this is now the norm with compensation and nominating committees as well. CEO evaluation and selection is also performed by the independent directors. Finally, increasingly frequent announcements of restructurings, reorganizations and replaced CEOs are encouraging signs that boards are asserting their independence and acting more decisively to deal with the issue of sub-par performance.

These are significant changes, but improvements in the corporate governance process are still essential.

While wholesale change is clearly not merited, [17] the corporate governance system must continue to be refined and improved. This is an ongoing process applicable to all companies, but more urgently needed in some than in others whose performance is currently good. Recognizing the vast and healthy diversity of methods of organizing corporations, we recommend:

A. Boards should insure they have processes in place which enable them to function independently in their task of monitoring and evaluating corporate performance. [18] Key aspects of this independence include:

1. establishing an appropriate structure for the operation of the board including the number of directors to serve and their qualifications, the selection and accountabilities of committees and their chairs, a process for selecting, where appropriate and necessary, a director(s) with special responsibilities, and the establishment of special require-

ments such as age or term limits for directors;

2. establishing appropriate procedures at the full board level to oversee the formulation and realization of the long-term strategic, financial and organizational goals of the corporation;
3. establishing appropriate committees comprised solely of independent directors to oversee the auditing, compensation and nominating responsibilities of the board; and
4. establishing appropriate procedures to assure the board receives appropriate information from managers upon which to base decisions, devotes sufficient time to the review and discussion of such information, and is able to independently evaluate such information.

B. Boards should establish criteria and procedures for evaluating their own processes and performance, as well as the performance of the CEO. These criteria should be based on a clear understanding of the board's accountability to shareholders and, as appropriate, to various other constituents of the corporation.

C. Boards should be informed of and approve management practices to impart information to shareholders, while ensuring against insider trading abuses. Where appropriate and, considering the resources involved, designees of the company should hold periodic meetings with shareholders.

Shareholder Monitoring in the Corporate Governance Process

Shareholder resolutions involving corporate governance procedures are now amassing an increasingly sizable percentage — frequently in excess of 30 percent — of the vote at annual meetings. Thus, shareholder activism as to voting procedures and board organization is now an established fact. What is more important, however, is monitoring the performance of corporations, not just by boards of directors, but also by informed and effective shareholders.[19]

An evolving system of institutional oversight clearly appears to be working. Some public pension funds and shareholder organizations have begun to focus their attention on specific company financial performance. These groups have increased their participation in shareholder meetings — in drafting statements, but mainly through increasingly successful use of the proxy voting system. A new institutional investor model — which has been referred to as "political" — embodies an approach in which active investors seek to change corporate policy by amassing voting support from dispersed shareholders. While still only marginally focused on performance, it is gaining support among corporations, boards of directors and institutional asset managers. Through a well-defined public process, "insurgents" seek to educate shareholder voters and propose alternatives to the policies of "incumbents." The process is still largely unorganized and episodic. But the ensuing debate, when focused on issues relating to performance, promotes an informed, participatory and substantive approach to institutional investor oversight of management, without pursuing the more acrimonious, destructive transactions-based market for corporate control of the 1980s.[20]

Informal oversight tactics available to shareholders are remarkably varied. In numerous instances they have led to changes in corporate governance, while the more important ones have produced changes in management and performance. For example, active private and public institutional shareholders have: solicited votes for a proposal urging a company to engage in a spinoff; articulated an alternative business plan and showed that the company can do better by sticking to its core business; and supported independent director nominees.[21]

A few institutional investors also make use of other investment approaches which, although they involve significant monitoring costs, will result in a long-term relationship between those institutions and the boards of the corporations in which they invest:

- a portion of an institution's portfolio can be actively managed by specialists in a particular industry;
- an institution can provide "patient capital" either directly or through actively managed funds; or
- an institution can buy larger stakes, presumably in many fewer companies, and develop a working relationship with management.[22]

In the area of shareholder monitoring, we recommend:

A. That institutional investors seek to influence the management of corporations and make corporations accountable for poor performance through their boards of directors by using the processes discussed in this paper, but not by attempts to "manage" the companies.

B. That measures be adopted to open up the process to improve communication among shareholders and between shareholders and corporations. In this context, the proposed SEC rules facilitating such communication were discussed, though not critiqued. Subsequently, the Subcouncil members indicated their approval of these rules, except for a few members who voiced their disagreement.

C. That companies and shareholders recognize the potential for improved, constructive shareholder monitoring as employees acquire and hold increased amounts of stock of the firms in which they work. [23] In the 1,000 companies where employees have significant holdings, these employees now own an average of 12 percent of the stock — with stakes in Proctor & Gamble, Chevron, and many other large corporations even higher. Employees will soon own an average of 15 percent of the stock in these corporations as savings and share ownership plans expand. Participation on the plant floor could turn into participation in the boardroom as a critical mass of employee ownership approaches. Employee/shareholders[24] are one of the new shareholder groups most likely to play an increased and potentially positive role in corporate governance.[25]

D. That no change be made in the current restrictions on the corporate holdings of common stock by various types of institutional investors.[26] Under these restrictions, defined benefit plans covered by the Employee Retirement Income Security Act (ERISA),[27] mutual funds, and bank collective investment funds are prohibited from investing more than a limited amount of their assets in one company.[28] ERISA also requires that plan assets be diversified; many plans, however, own stock in more companies than are needed for optimal diversification, and others are taking the ultimate diversification step of replicating indexes such as the S&P 500.[29]

These and other restrictions and limitations were developed over a period of years following the Depression; they are designed to prevent abuses and are in the American tradition of blocking significant concentration of power. They are not likely to be changed. [30] Moreover, there is no clear evidence that facilitating increased concentration of ownership by certain institutions such as banks and mutual funds would result in better corporate governance or performance; they do not, in general, appear to use the corporate governance power they currently have.

Shareholder oversight is being conducted by just a few organizations. Some question whether institutional investors have the expertise or the will to provide an optimal level of corporate performance oversight. The Subcouncil takes note of this. It believes that optimal oversight requires heightened responsibility from all parties in the corporate governance process. The quality of the leadership and expertise of institutional investors is as important as the quality of management and expertise of the corporations whose securities they own. [31] As the focus shifts to the performance of the corporations, the spotlight must also be directed on the management of the activist institutions.

Certain public and private funds and other asset managers already actively monitor their investments and do not hesitate to express their views on company plans and performance. There are signs that others are adding analytical and communications capabilities, which is a welcome development. On the other hand, most funds do not generally make use of the communications and monitoring opportunities already available. They have not yet developed the staff or consultants necessary to monitor actively, nor are they expected to.

4. Focus on Performance for Enhanced Competitiveness

Boards of directors, especially in the absence of numerous and involved shareholders, must establish effective means of identifying corporate underperformance and a means of communicating that to shareholders to effect improved short or long-term performance in a timely fashion. Boards must expand their analysis of performance beyond financial measures.

Many, if not most, American corporations currently perform superbly in international and domestic markets. They do so in the environment of our intangible short-term culture, our highly fluid financial markets, the current norms of institutional investors, and the present system of corporate governance, much of which will be slow to change.

Our competitiveness problems will persist, therefore, unless we take steps to improve our present corporate performance evaluation system. The present processes fall woefully short of what the American economy needs.

Corporate Performance Evaluation

Within the next decade, says Peter Drucker, institutional investors may not invest in corporations unless they have available a "business audit." [32] While boards may be organized under diverse structures, we recommend, as previously discussed, that they establish procedures which will enable them to conduct a more thorough and meaningful assessment of the performance of their company and of its leadership.

There should be an assessment of the company's long-term financial, strategic and organizational performance in relation to goals previously established by management and the board. This assessment of company performance should also include an examination of the company's historical trends as well as its performance in relation to that of competitors and/or similar companies. Assessments by directors should include both company and CEO performance.

More is needed, though, to put a sharp focus on performance. Given the present organization, which we do not recommend changing, certain pension systems and other major investors will not find it cost-effective and will be reluctant to perform thorough performance analyses. Their representatives should not serve on Boards of Directors. The companies, therefore, will have to take the initiative as to performance evaluation.

Boards should establish procedures for their investors to obtain appropriate in-depth performance and strategic planning information. Such a discussion should appear in the company's annual report, especially when the company's long-term performance and outlook is not satisfactory. In these situations, appropriate means for institutional investor comment, in the same or other documents, should be established.[33] Sustained underperformance does not always have to lead to a sale of stock. It can lead instead to a constructive debate between a company and its shareholders, as we are calling for, and can reduce so-called short-term pressures. Finally, when evidence of underperformance is available to them, informed institutional shareholders must have the will to force change.[34] This will improve performance and the nation's competitiveness.

Broader Performance Measurements

The present analytical framework for US corporations emphasizes traditional financial and economic quantitative data, such as return on investments and other numerical ratios. This process is oriented towards predicting stock prices and performance in the current capital allocation climate, but reinforces the bias against investing in more qualitative areas, as described above.

Competitive realities demand new performance measurement systems, and should precipitate a "revolution" in the use of nonfinancial measurements of corporate performance. We recognize, though, that the development of non-financial measurements is fraught with difficulty.

Current quantitatively based accounting measures leave considerable room for judgment in evaluating performance. The difficulties in qualitatively evaluating performance increase exponentially when dealing with "softer" areas which may not be comparable among companies. However, the process of developing these measures will lead to more of a focus on long-term performance both on the part of companies making the investments and on the part of investors contributing their capital.

Two of the nation's leading business organizations are now actively studying the use of nonfinancial measures of corporate performance. First, the American Institute of Certified Public Accountants (AICPA) has established a Subcommittee on Financial Reporting. This Subcommittee is meeting with investors and other constituent groups to develop their findings, and final recommendations are expected in the spring of 1994. [35] Second, the Financial Executives Institute (FEI), an organization of the CFOs, treasurers and comptrollers of the major US corporations, have established a "Center for Information Technology and Strategy" to study, among other things, non-financial measures of corporate performance. The Center is conducting analyses, studying individual corporation processes, conducting roundtables with CFOs, institutional investors and regulators, and will soon circulate tentative results. Final results and guidelines are also expected in the spring of 1994. [36]

Qualitative indicators of corporate performance — quality of products, customer satisfaction, employee training, and strategic direction — are now routinely discussed internally in well-managed and successful corporations. They may be discussed with boards of directors, though rarely in a formal sense. They are discussed with a select group of "fundamental" security analysts who develop qualitative opinions based on personal dialogue with company officials. However, a more systematic development of these measures is called for. The widespread dissemination of strategic planning indicators can assist both corporations and investors in broadening their articulation of factors (such as expenditures for training) considered important in the investment process.

The advantages of using such nonfinancial concepts[37] to measure corporate performance, as a supplement for traditional measurement methods include:

- current accounting systems do not square with economic reality and are not doing the job of accurately measuring performance in this broader context;
- nonfinancial measurements tell much more about the "true value" and "strategic positioning" of the corporation than many of the more traditional financial measurements; and
- they will greatly assist those institutional investors who invest for the long-term and can encourage investors to stay with a company, when sole reliance on financial measurements might suggest otherwise.

Boards of directors and various institutional investors need to be exposed to nonfinancial measures of corporate performance, and should involve themselves in the development of these standards by meeting with groups such as the AICPA and FEI committees. Though perhaps far off, these measures need to be standardized to the extent possible so that there can be appropriate cross industry and business comparisons. Non-financial measures of performance need to be exposed to the investing public.

III. Conclusion

Alan Seelenfreund, Chairman and CEO of the McKesson Corporation, and a meeting participant, had the following advice:

- Make continued incremental changes in the corporate governance system so that both institutional investors and corporate boards of directors can better evaluate corporate performance and take action to improve situations where that performance is lagging.
- Improve the development of information and accounting for intangible asset investment which would conform the information content of accounting with economic reality.
- Focus on lengthening corporate America's perspective for investment evaluation and thereby favor (or at least not penalize) a shift in emphasis to strategic projects with delayed payout.

The Subcouncil agreed with these comments as an appropriate summary of much of its work and as a blueprint for the future. We believe that if we are to enhance our competitiveness, all the participants in the financial markets and the corporate governance system must begin to think differently about the capital formation process, its goals and means of achieving them. This requires considerable effort on the part of corporate boards, management, institutional investors, financial intermediaries and other participants. The financial markets and the corporate governance system provide an inter-related process of oversight which is working in the current context, but which must be improved to allow greater focus on tangible and intangible investments related to the strategic positioning of our industries in world markets.

What is needed is: improvement in communications among all investors and corporations; active board and shareholder oversight of poorly performing companies; financial and non-financial analyses of corporate performance which enable shareholders to evaluate properly the overall long-term performance of management; and the will to act on this information.

Notes

1. Competitiveness Policy Council, *Building a Competitive America*, First Annual Report to the President and Congress (Washington, D.C.: Competitiveness Policy Council, March 1, 1992) p. 2.

2. See, for example, general discussion by members of the Subcouncil on Corporate Governance and Financial Markets at its June 2nd meeting in Philadelphia, and at its September 24th meeting in San Francisco, as well as Presentation by Alan Seelenfreund, Chairman and CEO, McKesson Corporation, at the September 24th meeting. We chose for ourselves a vital but necessarily limited topic regarding the relationship between our competitiveness and our financial market and corporate governance systems. The equally vital subject of macroeconomic factors was discussed, as indicated, but we did not hear in-depth evidence on specific factors as to that subject. We also take note of the fact that the macroeconomic environment is being extensively discussed as part of the work of other subcouncils, including that of the Subcouncil on Capital Formation.

3. Competitiveness Policy Council, *op. cit.*

4. Michael Porter, *Capital Choices: Changing the Way America Invests in Industry* (Washington, D.C.: Council on Competitiveness, June 1992). For example, America's investment rate, as a percentage of Gross Domestic Product (GDP), remains significantly less than that of Japan and below all other major competitors. In 1990, net private investment (NPI) in Japan was approximately 22% of its GDP. Germany's NPI was approximately 10% of its GDP. In the United States, however, NPI was only approximately 4% of its GDP. Competitiveness Policy Council, *op. cit.* p. 19.

5. *Ibid.*

6. *Ibid.*

7. Many Subcouncil members believe the issue is not one of time horizons for investment. Rather, the issue is the nature of the types of investments needed to enhance competitiveness, regardless of how long investment money is committed. There are many types of corporations which invest along different time frames; what is short term for the electric utility is long term for the toy industry. There are also many types of investors who invest with different time horizons and objectives; some index and hold for years, while others are more quantitatively oriented and trade more frequently; life insurance companies tend to invest more heavily in debt instruments than either public or private pension funds. All these participants combine to produce highly liquid and efficient markets.

   Nor is the issue "transient" or fragmented shareholder ownership. Owners come from all investment schools and behave with more or less impact on the corporate governance process. Our system has many large, long-term owners, some active and some passive. Even passive investors with small blocks of shares, if they are vocal, can have an impact on the corporate governance process. The key is whether investors — regardless of their make-up or time horizons — have the means to monitor and communicate, as well as the will to act to effect changes either in the direction of corporate investment or in the corporate governance/strategic planning process or both.

   Thus, the concept of short-termism ignores the complexity of the financial market system, the varying investment strategies of each type of investor, and the varying time frames for corporate investment and strategic planning.

8. Memorandum from John Pound to Subcouncil Chairman Edward V. Regan, November 4, 1992.

9. See Presentation of Dr. Bruce R. Guile at the Subcouncil's June 2nd meeting in Philadelphia, also Bruce R. Guile, ed. *Time Horizons and Technology Investments* (Washington, D.C.: National Academy of Engineering, 1992).

10. US Securities and Exchange Commission, The Office of Economic Analysis, *Institutional Ownership, Tender Offers, and Long-Term Investments* (Washington, D.C.: US Government Printing Office, April 19, 1985). See also Randall J. Woolridge, "Competitive Decline: Is a Myopic Stock Market to Blame?" *Journal of Applied Corporate Finance*, Spring 1988, as cited by Peter L. Bernstein, "Are Financial Markets the Problem or the Solution? A Reply to Michael Porter," *Journal of Applied Corporate Finance*, Summer 1992.

11. See, for example, Presentation by Professor Kenneth A. Froot at the Subcouncil on Corporate Governance and Financial Market's June 2nd meeting in Philadelphia; also Kenneth A. Froot, Andre F. Perold, and Jeremy C. Stein, *Shareholder Trading Practice and Corporate Investment Horizons*, Prepared for Time Horizons of American Management, a joint project sponsored by Harvard University and the United States Council on Competitiveness. March, 1991.

12. Froot, Perold, and Stein, *op. cit.*

13. Robert J. Shiller, *Who's Minding the Store?* Background paper for the Report of the Task Force on Market Speculation and Corporate Governance (New York: The Twentieth Century Fund, 1992).

14. An important issue is the fundamental link between the development of derivatives, pricing in the secondary securities markets and the ability of corporations to raise money in the capital markets. Throughout the 1980s, most of the expansion of businesses was financed through retained earnings. See, for

example, discussion by John Neff, Senior Vice-President, Wellington Management, at the Subcouncil's June 2nd meeting in Philadelphia; and Kevin F. Winch, *Corporate Finance Trends: 1989*, Prepared for Subcommittee on Telecommunications and Finance, Committee on Energy and Commerce, US House of Representatives (Washington, D.C.: Congressional Research Service, October 1989) p. 6. See also comments by Subcouncil members on the draft report.

During the 1990s, however, we find a significantly improved initial public offering market and a major trend to replace debt with equity to correct the overinvestment in debt which occurred during the 1980s. Thus, corporations are more likely to view their stock price in the secondary market as a more important component of their cost of capital than when they were financing through retained earnings.

15. See, for example, Presentation by James Cochrane, Senior Vice President, New York Stock Exchange, at the Subcouncil's June 2nd meeting in Philadelphia. Also: New York Stock Exchange, *Market Volatility and Investor Confidence: Report to the Board of Directors* (New York: New York Stock Exchange, June 7, 1990).

16. See, for example, comments by Hon. Richard Breeden, Chairman, Securities and Exchange Commission, at the Subcouncil's June 2nd meeting in Philadelphia.

17. The Subcouncil does not recommend wholesale change in the operation of the US corporate governance system to move this system more towards, for example, the German or Japanese systems. There is, at best, mixed evidence that, over the long-term, alternative systems, such as those of Germany or Japan, lead to better economic outcomes. These systems have arisen in the context of different cultures and political systems and their overall experience is not necessarily transferrable to our system. [John Pound, *The Rise of the Political Model of Corporate Governance and Corporate Control*, working paper prepared for the Subcouncil on Corporate Governance and Financial Markets of the Competitiveness Policy Council, September, 1992]. Nevertheless, we do find attractive certain aspects of German and Japanese relationships between shareholders and corporations (large, long-term, patient investors, who knowledgeably participate in the corporate governance process). (Ira M. Millstein, *The Evolving Role of Institutional Investors in Corporate Governance*, working paper prepared for the American Bar Association Panel on Institutional Investors, August 10, 1992).

18. See, for example, Presentation by Martin Lipton and Jay W. Lorsch at the Subcouncil's August 5th meeting in Minneapolis; also Martin Lipton and Jay W. Lorsch, *A Modest Proposal for Improved Corporate Governance*, Working Paper prepared for the Subcouncil on Corporate Governance and Financial Markets of the Competitiveness Policy Council, (revised) August 20, 1992. In addition, the Business Roundtable set forth in its March 1990 Paper, *Corporate Governance and American Competitiveness*, a model of board managerial oversight responsibilities and responsibilities to: evaluate the CEO; review financial objectives, major strategies and plans of the corporation; and evaluate board processes and performance. The Roundtable also sets forth principles of sound board structure, including board size, qualification, independence, and committee structure including formation of audit, compensation/personnel committee and nominating committees made up only of non-management directors. Finally, The Working Group on Corporate Governance makes numerous recommendations for board evaluation of itself, the CEO, and the performance of the company. See: Working Group on Corporate Governance, "A New Compact for Owners and Directors," *Harvard Business Review*, July-August 1991.

19. Letter from Subcouncil Member Bruce Atwater, Chairman and CEO, General Mills Inc., to Edward V. Regan, September 25, 1992.

20. John Pound, *The Rise of the Political Model of Corporate Governance and Corporate Control*, working paper prepared for the Subcouncil on Corporate Governance and Financial Markets of the Competitiveness Policy Council, September 1992.

21. *Ibid.*, p. 30, where specific examples are described for changes made at Honeywell, Lockheed, and other major corporations.

22. Millstein, *op. cit.*

23. Several Subcouncil members expressed concern that employees as a group were no more likely to make "informed shareholder" monitoring decisions than other institutional investors and were, in some cases, likely to be less objective. Most agreed that employee/shareholders bear the same responsibilities as other shareholders to evaluate objectively the long-term performance of management. Other Subcouncil members noted concern that employee/shareholders may currently be too passive as owners. They note that employee/stockholder representation on the board is rare; and, in the absence of greater employee organization, management may view employee shareholdings as a block of stock at its own disposal.

24. Some Subcouncil members believe we should consider introducing into the American system of corporate governance worker representatives on corporate boards because of their role as principal stakeholders, regardless of whether or not they are owners. Such a development would contribute significantly to ensuring a longer-term perspective since no group is more

interested in the long-term viability of an enterprise than are its employees. There are, as well, other major stakeholders, such as the communities in which the enterprises are located, who would also be appropriately represented on boards of directors.

25. Joseph R. Blasi and Douglas L. Kruse argue that employee shareholders most likely will play an increasingly important role in the corporate governance of the firm for the following reasons: (1) alongside other institutional investors, employees will emerge as the new "relationship investors" in American business; (2) these employees will increase their concentration of holdings if the company's long-term performance prospects measure up to reasonable expectations; (3) they are likely to continue their "patient capital" orientation towards the company; and (4) these employee/owners have special knowledge about company operations which enables them to better evaluate long-term performance. Blasi and Kruse argue that:

> "... shareholder rights will become the new focal point of the employer-employee relationship. Employees will not only play a role as "bankers" and "investors" to public corporations, but as shareholders they will have a "principal-agent" relationship with senior management and the board of directors. This trend will generate modest moves by employee shareholders to be formally recognized as "owners" in public companies." Joseph R. Blasi and Douglas L. Kruse, *The New Owners: The Mass Emergence of Employee Ownership in Public Companies and What it Means to American Business* (New York: Harper Collins, 1992) p. 235.

26. Porter, *op. cit.*, recommends changes in the regulatory environment to permit institutional investors to hold greater concentrations of a company's stock and become "relationship investors." However, the Subcouncil is in agreement with the presentation of Ira M. Millstein, which states that no change in the regulations regarding concentration of equity holdings is currently necessary in order to achieve "relationship investing." According to Millstein: "The limitations and impediments to effective institutional governance action are not insubstantial. Nevertheless, they can be overcome with a little effort and primarily by modifying, to a degree, the culture that permeates the governance paradigm and the investor universe." Ira M. Millstein, *The Evolving Role of Institutional Investors in Corporate Governance*, working paper prepared for the American Bar Association Panel on Institutional Investors, August 10, 1992.

27. We note that ERISA applies directly only to private and labor pension funds. However, many states have adopted versions of ERISA to apply to their public pension fund systems.

28. See for example, Memorandum from Betty L. Krikorian, Esq., and Associate Director, Morin Center for Banking Law Studies, Boston University, to the Subcouncil staff, November 13, 1992. ERISA prohibits defined benefit plans from investing more than 10 percent of plan assets in the sponsoring company's stock although other defined contribution plans , such as ESOPs, are permitted larger holdings. Also, ERISA's diversification requirements limit concentration of ownership. Mutual funds are generally limited to acquiring 10 percent of a company and are prohibited from putting more than 5 percent of their assets into one company.

29. Memorandum from Kathleen Utgoff, former Director, Pension Benefit Guarantee Corporation to the Subcouncil staff, November 13, 1992.

30. Mark J. Roe, "A Political Theory of American Corporate Finance." *Columbia Law Review*, Volume 91, No. 1 (January, 1991).

31. See Comments by Ira M. Millstein at the Subcouncil's September 24th meeting in San Francisco, as well as Letter from Subcouncil member Bruce Atwater, *op. cit.*

32. See Peter F. Drucker, "Reckoning with the Pension Fund Revolution," *Harvard Business Review*, March-April 1991, pp. 113-114. Prominent business commentator Drucker writes that such an audit may not be just around the corner, but corporate self-evaluation is increasing. He writes of institutional investors who can benefit from such audits:

> "Not being businesses...[t]hey are not business-focused, nor could they be. They are asset managers. Yet they need the in-depth business analysis of the companies they collectively control. And they need an institutional structure in which management accountability is embedded.
>
> In an American context, the business analysis - call it the business audit - will have to be done by some kind of independent professional agency...I suspect that, in the end, we shall develop a formal business-audit practice, analogous perhaps to the financial-audit practice of independent professional accounting firms. For while the business audit need not be conducted every year - every three years may be enough in most cases - it needs to be based on predetermined standards and go through a systematic evaluation of business performance: starting with mission and strategy, through marketing, innovation, productivity, people development, community relations, all the way to profitability. The elements for such a business audit are known and available. But they need to be pulled together into systematic procedures. And that is best done, in all likelihood, by an organization that specializes in audits, whether an independent firm or a new and separate division of an accounting practice."

33. For example, see discussion in Lipton and Lorsch, *op. cit.*, pp. 30-31. Lipton and Lorsch write:

> "... when the company's performance is not satisfactory, we believe that the company should provide investors with more information about the companies difficulties, and the actions that the Board and management are taking to correct the situation, than is normally provided in the "Management Discussion and Analysis" section of the company's periodic reports.
>
> Specifically, if in three of the past five years a company has failed to meet its goals or plans, or suffered losses or declines in earnings, or erosions in competitive positions, or has underperformed the market averages or its competitors or peer group of companies, a special section of the annual report should be prepared under the supervision of the independent Directors.
>
> This special report should describe the causes of the problems and the actions that the Board and management are taking. This special report should be continued in subsequent annual reports until the problem has been rectified. While this special report may in some situations relate to certain elements of the CEO performance review, we do not intend that such review be published or necessarily referred to in any way in the special report or otherwise.
>
> When a corporation's underperformance triggers these explanations in the annual report, substantial shareholders should be entitled to voice their views through the proxy statement for the annual meeting."

34. Letter from Bruce Atwater, *op. cit.*

35. See Presentation of Mr. Edmund Jenkins at the Subcouncil's September 24th meeting in San Francisco, see also American Institute of Certified Public Accountants, *The AICPA Special Committee on Financial Reporting* (Washington, D.C.: American Institute of Certified Public Accountants, July 1992).

36. See Presentation of Dr. Robert G. Eccles at the Subcouncil's September 24th meeting in San Francisco, also Robert G. Eccles, "The Performance Measurement Manifesto," *Harvard Business Review*, January-February, 1991, and Robert G. Eccles, James V. McGee, and Philip J. Pyburn, *Economic Reality in Financial Reporting: The Role of Nonfinancial Measures*, Progress Report for Phase I of the Financial Executives Research Foundation Economic Reality in Financial Reporting Research Project (Boston: Ernst & Young, September, 1992).

37. Several Subcouncil members were skeptical about the extent to which nonfinancial measures could adequately be developed to substitute for traditional financial measures to reflect the "true value" of the corporation.

Papers Commissioned

Papers Commissioned by the Subcouncil on Corporate Governance and Financial Markets:

Jenkins, Edmund L. *Nonfinancial Measures of Business Performance*. Written for the Competitiveness Policy Council, September 30, 1992.

McGee, James V. *Performance Measurement Research: Activities and Deliverables for 1993.* October 1, 1992.

Millstein, Ira M. *The Evolving Role of Institutional Investors in Corporate Governance.* Prepared for *The American Bar Association Panel on Institutional Investors: Monolithic or Diverse? Implications for Corporate Governance.* July 1992.

Pound, John. *The Rise of the Political Model of Corporate Governance and Corporate Control.* September 1992.

Concurring Views and Rejoinder

By John Pound, *Kennedy School of Government, Harvard University*

Co-Sponsoring Members of the Subcouncil

Bruce Atwater
Chairman and CEO, General Mills, Inc.

Lewis Bernard
Advisory Director,
Morgan Stanley and Co.

Gordon Binns
President, General Motors
Investment Management Corporation

Richard Breeden
Chairman,
Securities and Exchange Commission

Patricia Lipton
Executive Director,
Wisconsin Investment Board

Philip Lochner
Senior Vice President, Time Warner, Inc.

John Neff
Senior Vice President,
Wellington Management Company

Christopher Steffen
Chief Financial Officer,
Honeywell Inc.

Introduction

We believe that the Subcouncil has performed an admirable job in reviewing a difficult and complex problem and coming forward with a series of moderate, yet important, recommendations. The gist of the Subcouncil's message is that American corporations and shareholders are formulating a coherent and appropriate answer to corporate governance, centered on an evolutionary process that is based where it should be: in private markets. The focus of this emerging process is, and should be, on improving long-term corporate performance. This is consistent with the dictates of a free-market corporate system, competitive capital markets, and the broad message of American history during two hundred years of evolution of corporate governance.

We also believe that the Subcouncil has wisely refrained from the temptation to endorse problems that are not borne out by the evidence, and from the temptation to suggest "solutions" in the corporate governance arena that involve either broad restructuring of capital markets or the imposition of arbitrary new approaches and internal practices on corporations or investors. American markets must be allowed to evolve and seek optimal private solutions in the corporate governance arena. The imposition of either sweeping structural change or any one set of new practices is not in anyone's best interest over the long term. We believe that it is better to trust markets to adapt, and to intervene only as necessary, than it is to risk the economic fallout that would arise from either of these kinds of mandatory change.

In this brief paper we wish to amplify our comments as a complement to the Subcouncil report. We offer an additional perspective in those areas where we believe that a more pointed and emphatic viewpoint is useful.

1. Time Horizons and "Underinvestment"

We do not believe that any convincing evidence exists that suggests that a pervasive underinvestment problem is present in the US, or that US capital markets are characterized by short time horizons. These ideas were presented to the Subcouncil several times and resoundingly rejected at each juncture. Indeed we believe that there is no other issue on which the Subcouncil was more united than in its disagreement with the proposition.

We would emphasize that there is simply no systematic empirical evidence to support this hypothesis. Indeed over thirty years' worth of research on the efficiency of financial markets has implied precisely the reverse — that there is no systemic myopia or short-term orientation in American markets. Some recent analyses that suggest widespread reform of our markets posit that this problem exists; but they provide no evidence to refute the huge body of scientific study that suggests that no such problem exists. We believe that few Subcouncil members were persuaded by the idea that a fundamental problem exists in the way in which American markets allocate capital.

We believe that as policy-makers review the evidence on American investment patterns, an important distinction is in order. There are a number of sectors and firms in the economy that have difficulty attracting capital. In and of itself, that fact is not a manifestation of an inefficient market, but rather, of an efficient one. Efficient capital markets are supposed to allocate scarce available capital to those firms and projects — long-term or short-term — that provide the highest return, measured in terms of present discounted value. One part of this task is finding the best projects and making capital available. Another part, however, that is less widely recognized, is denying capital to those firms that cannot provide long-term returns commensurate with other investment opportunities.

This is the source of a great deal of tension between firms and capital markets, and indeed between Wall Street and Main Street. Corporations and their managements are oriented — as they rightly should be — towards their own success. Capital markets, however, are concerned with optimal allocation across the economy, and often as a consequence must deny funds and shut down projects. When this happens, managements who have spent their lives and reputations developing a particular product or technology will not be happy. But the resulting competition for capital is no different than the competition among, for example, brands of autos. Some teams invest years of effort and stake their future on a new car, only to have it fail. The same will be true of attracting capital in an efficient market.

Some evidence presented to the Subcouncil — in particular, the evidence contained in the National Academy of Engineering study — is a reflection of the fact that our capital markets are efficient and discriminating. In that study, some companies report facing difficulty in attracting capital for "long-term" projects while others do not. It is important to note that the companies in that survey that express concern about raising capital are as a broad rule older technologies and businesses, while those that do not have trouble are businesses with high growth potential that represent the future. The latter companies are no more short-term in orientation but indeed in many respects are longer-term; they are simply a good net present value investment for capital markets.

The fact of the matter is that looking back over the past three decades, companies that were persistently and pervasively undervalued by the capital market were ones that were dealing in dead technologies or making very basic mistakes in strategy. It is the job of capital markets to deny such companies capital, and not the job of this Subcouncil to open the door to suboptimal investments by giving credence to the "underinvestment" myth.

2. The Information Gap Problem

We are also skeptics as to the degree and importance of the so-called "information gap" problem to American investment and competitiveness. There are a number of theories that suggest that such gaps may plague investment in the US. But again, the facts have not borne these theories out and indeed militate strongly against this conclusion.

Several facts are pertinent. First, once again, there is not evidence suggesting either that firms are systematically mis-valued or that they cannot attract capital when they have positive net present value projects to finance. Second, we disclose a remarkable amount of information about firms through both formal and informal mechanisms in the US, and analysts are typically not lacking in information. Third, it is true that some corporations develop reputations that make it difficult to attract capital. But reputations in capital markets, as elsewhere, are often justified. Fourth, even firms with bad reputations have available means to signal that their current investment plans will be profitable.

3. The State of Corporate Governance and Proposals for Change

Corporate governance practices are in the midst of a thoroughgoing and fundamental evolution. That evolution is reflective of the great strengths of American capital markets: their diversity, openness, and tolerance for change. A uniquely American solution is arising to corporate governance concerns, in which the existing system is made better by incremental improvements in how institutional investors behave, how corporations behave, and how existing rules are used to forge new solutions between investors and corporations.

Change — whether evolutionary or revolutionary — is inevitably disconcerting. As a consequence, it inevitably breeds proposals for "reform." The corporate governance process is currently under siege by a broad variety of critics who are suspicious of our capital markets and the ability of our system to cope. The *Capital Choices* report argues that we should essentially forsake the open markets and dispersed ownership structure that we have had in the US during the twentieth century, in favor of a system of close relationships based on the German and Japanese models. The recently-issued Twentieth Century Fund Report argues in part that there is not sufficient emphasis on "minding the store" in American capital markets, and likewise argues for a variety of new regulatory changes. Several members of this Subcouncil propose that bodies such as the Subcouncil adopt a set of proposals which would impose a new set of specific requirements on how corporate governance should be pursued within all major American corporations.

We commend the Subcouncil for rejecting this approach and urge that other policy-making bodies exercise similar caution in endorsing policies that would mandate wholesale change or the adoption of rigid new approaches to governance. The broad reform agendas suggested by a number of observers, as we have argued earlier in this paper, are based on the alleged existence of problems that empirical evidence suggests simply do not exist in reality. More limited new requirements about investor or corporate behavior, such as those proposed to the Subcouncil by some members of this body, have a different problem: their inherent arbitrariness. They suggest the imposition of one rigid set of internal practices by all corporations, in the hope that those approaches will ultimately prove better on average than the ones which they supersede.

The strength and indeed the entire philosophic basis for competitive markets derives from the reality that "magic" solutions do not exist for most corporate governance issues. Instead, the existence of a liquid and fluid private market, and the actions of newly-energized investors and corporations, should result in the adoption of a wide series of changes that are optimal given the specific needs, personalities, and politics of particular situations. The adoption of broad structural changes that rendered the market less competitive would not enhance governance. The imposition of specific new behavioral requirements — particularly ones that have not been systematically tested and proven effective — seems to us like unnecessary and potentially dangerous experimentation.

By making these arguments, we do not mean to suggest that investors or corporations should remain passive, and we do not mean to endorse the status quo. Indeed just the reverse is true. There is much that institutional investors can do to address poor corporate performance within the existing corporate governance system, and there is much that corporations can do to respond constructively and positively. Institutions should become more expert and effective in evaluating corporations. Corporations should become more open to investors' concerns and the signals sent by the marketplace. Accomplishing these goals means that both investors and corporations should pro-actively seek creative new approaches. Instead, we mean to make only one important distinction. The bulk of behavioral change and specific new practices should come from voluntary cooperative activities undertaken by private market participants. One restructures the market or imposes specific behavioral change, in our view, only when it is evident that because of a systematic failure in incentives, the market is failing to provide the right solution on its own.

Indeed seen from this viewpoint, we would note that there is a great irony in recent proposals that suggest fundamental structural reform by corporations or in capital markets, because it is in fact now that the evidence is clearly beginning to suggest that the market and the system as it now stands are providing appropriate incremental solutions in the governance arena on their own. A few years ago, at the height of the hostile takeover era, the ongoing, organic corporate governance process was not functioning as well as it is today or as envisioned in law. Ultimately, the market solved many of the excesses of that era on its own. The governance process now offers few constraints, the opportunity for innovation, and the incentive for incremental action. Sweeping reform proposals would have been more understandable if the old dynamics had persisted until today. Instead, however, after the developments of recent years, the problems and controversy that used to plague corporate governance have receded and new, creative solutions are beginning to appear on their own. Now is thus precisely the wrong time to be advocating either sweeping change in the structure of capital markets, or the imposition of rigid new internal practices governing how corporations or investors must respond to each other or structure their governance activities.

The variety of private solutions that are appearing is rich, varied, and vivid. Ceridian Corporation, for example, held a board meeting earlier this year with its top institutional investors. Lockheed has an extensive shareholder outreach program through which it vets new corporate policies. Avon has worked with an active investor group and a shareholder committee, and its CEO has registered a dramatic performance turnaround. The recent changes at Westinghouse constitute an important prototype for achieving negotiated change involving the board, the CEO, and major investors.

These solutions are all different. None of them involves the specific new practices suggested to the Subcouncil by some proponents, nor is it obvious to us that the progress of these corporations would have been furthered by these kinds of proposals. Indeed such requirements might have upset the delicate politics of the situation and resulted in a reversal of progress.

We would make one final distinction. We are not opposed to vigorous attempts to market new, specific ideas to individual corporations and investors in the private market. Such an effort constitutes the essence of a process of market-based, evolutionary progress in corporate governance. Ideas that stand the test of the market, and indeed are adopted, will prosper, and we endorse the notion that at this critical time in the history of corporate governance, participants in the process should offer a wellspring of ideas to market participants to hasten change. In this way, most of the real changes in corporate governance will ultimately come not from policy — which sets only the broadest and loosest restraints on the behavior of participants in the governance process — but rather from the actions of forward-thinking investors and corporations who see the opportunity to "do the right thing."

We thus urge that suggestions be offered and that a pluralistic process of innovation be allowed to occur. But we caution strongly against the quick translation of any particular new approach into a new requirement imposing specific corporate or investor practices. We also caution against the even greater dangers associated with sweeping change in American corporate governance or capital market structure. We believe that the market will use the tools now available to develop a wide variety of specific new approaches, and we believe that the present structure of American capital markets provides the right incentive for an evolutionary process that will lead to more effective long-term corporate governance.

Dissenting and Concurring Views

Martin Lipton and Jay W. Lorsch

We do not agree with, and disassociate ourselves from, that part of the Subcouncil report that discusses Michael Porter's paper, *Capital Choices: Changing the Way America Invests in Industry.* We agree with Professor Porter that capital allocation and short-termism are key issues with respect to corporate performance and global competitiveness.

We are in substantial agreement with much of the corporate governance part of the Subcouncil report. However, we feel that the Subcouncil report should not just catalog the debate and make general recommendations, but should make very specific recommendations to improve corporate governance. To this end we submitted our proposal for corporate governance initiatives that could be implemented by unilateral action by corporations to the August 5, 1992 meeting of the Subcouncil in the form of a paper entitled "A Modest Proposal for Improved Corporate Governance". Our paper will appear as an article in the November 1992 issue of *The Business Lawyer* and we refer to it for references to the supporting literature. For the purpose of these concurring views we have adapted the recommendations in our paper to be in the form we propose for major national public companies. Based on the reactions to our proposal by both institutional investors and corporations, we believe our proposal is a means for achieving immediate and significant improvement in corporate governance.

Background

The recent adoption of new shareholder communications proxy rules by the Securities and Exchange Commission (SEC) culminated a three-year effort by institutional activists and "shareholder rights" groups, who requested proxy rule amendments designed to increase the power of institutional shareholders in corporate governance. The SEC's response made clear that the SEC had sided with the institutions in the proxy reform debate. The general thrust of the new rules is to facilitate shareholder activism.

While it is still too early to predict the full impact of the new rules, there is little doubt that they will have their intended effect of encouraging increased shareholder activism. Combined with the ever-increasing concentrations of institutional share ownership, the receptive political environment and the populist appeal of the compensation debate, the SEC's new shareholder communications rules are likely to spur an increase in shareholder proposals, additional pressure for corporate governance reform and greater public criticism of corporate practices disfavored by shareholder activists. It is clear that institutional investors are in the corporate governance business to stay. They will not just go away. They will continue to insist on accountability for poor corporate performance.

The corporate response to these developments will be extremely important in setting the tone for this increased shareholder activism. The debate over the SEC's proxy proposals reflected some of the hostility and mistrust between managers and shareholders that marked the takeover decade of the 1980s. At the same time, there is a growing recognition from both sides of the table that this hostility and mistrust may be destructive to the health of a company's business operations, avoidance of which is a goal that should be common to both shareholders and corporate management. The challenge for both groups is to find a means of channeling increased shareholder activism more constructively than it has been channeled in the past.

We believe that more effective corporate governance depends on strengthening the role of boards of directors. Our belief was reinforced by a recent speech by Chancellor William Allen of the Delaware Court of Chancery, one of the leading judicial scholars on corporate law. Chancellor Allen said:

> "The conventional perception is that boards should select senior management, create incentive compensation schemes and then step back and watch the organization prosper. In addition, board members should be available to act as advisors to the CEO when called upon and they should be prepared to act during a crisis: an emergency succession problem, threatened insolvency or an MBO proposal, for example.
>
> This view of the responsibilities of membership on the board of directors of a public company is, in my opinion, badly deficient. It ignores a most basic responsibility: the duty to monitor the performance of senior management in an informed way. Outside directors should function as active monitors of corporate management, not just in crisis, but continually; they should have an active role in the formulation of the long-term strategic, financial, and organizational goals of the corporation and should approve plans to achieve those goals; they should as well engage in the periodic review of short and long-term performance according to plan and be prepared to press for correction when in their judgment there is need."

If directors perform well the duties Chancellor Allen has outlined, they may prevent a significant portion of the long-term erosion of corporate performance that has plagued so many once successful corporations. By acting early and effectively, directors may prevent small problems from growing into a major crisis.

There are differences in opinion and ideas among business leaders, various types of institutional investors, lawyers and academics as to what changes (if any) in regulations and laws would be desirable. If we wait for this debate to be completed, we risk another decade (or more) of a continuation of these governance difficulties and the contribution they make to the decline of competitiveness. We also risk the imposition of ill-considered or politically motivated governance requirements that would cause serious harm, rather than improve corporate performance. We believe that improvements in corporate governance should be developed and adopted by corporations on their own initiative and not imposed by legislation, regulation, court decisions overruling settled principles of corporate law, or bylaw amendments originated by institutional investors.

Our proposal does not require major changes in what well-advised companies are already doing; indeed our view of the role and function of the board of directors is not that different from that of The Business Roundtable. Our proposal would not require any changes in laws or regulations, because it deals primarily with the way boards actually perform their duties and not the legal context in which they function. Nor does our proposal require correlative or compensatory action by institutional investors. Specifically it does not ask them to become patient long-term investors, to participate in corporate governance activities, or to modify their investment policies, however desirable those changes might be. Our proposal is for unilateral action by corporations to be taken in their self-interest and not as part of a "deal" with institutional investors. In the form presented here our proposal is designed for major national public companies. It can be modified for smaller or local companies and special situations.

We do not argue that good corporate governance produces good corporate performance. Some of the most successful companies are managed by entrepreneurs who disdain what we view as good corporate governance. Nevertheless, we are convinced that if a company is underperforming due to poor management or persisting with a failed strategy, good corporate governance is the safety valve that can provide the means to deal with the problem and improve performance.

Our recommendations are intended to enhance the board's role as an effective monitor in a fashion which does not blur the distinction between the executives who manage the company and the directors who monitor its performance. We subscribe to Donald Perkins' view of the need to recognize "the very distinct differences between the daily responsibility of management and the periodic responsibility of directors to evaluate plans and results. Directors simply cannot and should not try to manage the daily affairs of the business."

Recommendations

Our recommendations contemplate that a company will adopt them as a complete package with such minor modifications as may be appropriate for its individual circumstances.

Board Size and Composition

The size of a board should be limited to a maximum of ten directors with a ratio of at least two independent directors to any director who has a connection with the company, either as management or substantial customer or supplier of goods or services. In addition, we would not view as independent an executive of another company on the board of which an executive of the company serves. A smaller board will be most likely to allow directors to get to know each other well, to have more effective discussions with all directors contributing and to reach a true consensus from their deliberations. We recognize that in some companies a larger board is functioning very well and that such companies should not abruptly reduce the size of their boards. In such situations we suggest that the reduction take place through attrition by retirement over a period of time.

Some argue that smaller boards will limit the range of viewpoints and ignore the need of our society for diversity in the boardroom. We believe that five or six independent directors, who are carefully selected, should provide the breadth of perspective and diversity required.

The composition of the board is critical to how well it functions. Membership should be geared toward making the board as independent and active as possible. Board members should be successful in their careers so that they do not rely heavily on their directorships for income or prestige. In this connection we recommend that each board establish, and update annually, the criteria to be followed in selecting candidates for nomination as a director of that company. Directors should have varied backgrounds, should be drawn from across the country so as to avoid a hometown clique and should be people who will take their commitment seriously.

We approve and adopt the proposal by Donald Perkins and a number of other thoughtful directors of major companies that each board should establish a term limit for the independent directors and we recommend a term of between 10 and 15 years. As a practical matter this is the only way in which a board can replace a director who no longer meets his or her responsibilities. Each board should also establish a mandatory retirement age for the independent directors and we recommend 68 as the appropriate age for most companies.

We endorse the now widely accepted view that a corporation should have an audit committee, a compensation committee and a nominating committee. Each of these committees should consist only of independent directors, one of whom should be the chair. Each independent director should serve on at least one of these committees.

We believe that given the time requirements for directors and the responsibilities they have, except in special situations a person should not serve on more than three boards.

Frequency and Duration of Meetings

Boards of major public companies should meet monthly and each meeting should take a full day, including committee sessions and other related activities. One meeting each year should be a two or three day strategy session. Directors should also spend the equivalent of another day preparing for each meeting by reviewing reports and other materials sent to them in advance. This would mean that directors would be expected to spend about 200 hours annually on each board, not counting special meetings and not counting travel time. We believe this much time is essential to allow directors properly to carry out their monitoring function. The additional meeting time will also have the salutary effect of strengthening the cohesive bonds among the independent directors.

Directors' compensation should be raised commensurate with the increased amount of time they are being required to spend. While financial remuneration is not an important reward for most independent directors, we believe a director should be compensated adequately for the responsibilities he or she assumes in accepting a directorship. We approve the growing trend toward stock options or restricted stock being used as a significant portion of director compensation, and we recommend that at least one half be in this form.

Because the limited time available is such an important issue, we believe that within each board it is essential to consider the way scarce meeting time is utilized. The agenda should focus the vast majority of the board's time on activities connected to its monitoring role. One way to assure that board time is well spent is to develop a board calendar, which specifies at which meeting the board will carry out various duties and reviews. A concrete sample of what we have in mind is the board calendar used by the Dayton Hudson Corporation, which provides for regular periodic review by the board of the following:

1. Strategic Planning
a. Annually review and approve the corporation's strategy
b. Be assured that the status of organizational strength and manpower planning is equal to the requirements of the long range goals
c. Approve a corporate philosophy

2. Long Range Goals
a. Review and approve the corporation's long range goals
b. Review and approve the corporation's financial standards, policies and plans

3. Manpower Planning
a. Elect top management
b. Be assured that management succession is being properly provided

4. Capital Allocation
a. Review and approve the corporation's capital allocations

5. Performance Appraisal
a. Review results compared with:
  A. corporate philosophy
  B. goals
  C. competition
b. Appraise top management
c. Approve annually the performance of the board and take steps to improve its performance

If board agendas were planned in this careful manner and meetings and preparation time expanded, we believe that there would be major progress in improving the effectiveness of America's corporate boards.

The Lead Director

In more than 70 percent of the major British public companies, the chairperson of the board is not the chief executive officer. In these British companies a non-executive outside director is the chairperson. The chairperson sets the agenda for the board, presides at the meetings of the board and of shareholders and, frequently, individually or together with the CEO, speaks for the company. The CEO manages the company on a day-to-day basis. This arrangement has worked well in Britain. It is one of the key recommendations in the Cadbury Committee's draft report on proposals to improve corporate governance in Britain.

In the United States the opposite approach prevails. Less than 20 percent of our companies have a separate chairperson and CEO. The vast majority of American CEOs are opposed to separating the two roles. The principal arguments against such separation are that: (a) it would dilute the power of the CEO to provide effective leadership of the company, (b) it creates the potential for rivalry between the chairperson and the CEO, leading to compromise rather than crisp decisiveness, (c) the chairperson may be overly protective of the CEO and shield the CEO from being held accountable by the board for poor performance, and (d) having two public spokespersons leads to confusion and the opportunity for third parties to take advantage of the division.

While we have reservations about the validity of some of the arguments against the separation, we see no need to face these issues directly. Instead, we recommend that those companies that do not have a non-executive chairperson designate one of the outside directors as the lead director. The lead director would not have a corporate title and would not have an office at the company headquarters. The lead director would not set the agenda nor preside at meetings of the board or of shareholders. Nor would the lead director act as a spokesperson for the company.

The lead director would be consulted by the chairperson/CEO on (a) the selection of the board committee members and chairs, (b) the board's meeting agendas, (c) the format and adequacy of the information directors receive, and (d) the effectiveness of the board meeting process. The lead director would also coordinate an annual evaluation of the chairperson/CEO by the outside directors. Finally, if the outside directors are confronted by a crisis because of the incapacity of, or failure of performance by, the chairperson/CEO, they would have a designated leader in place and would not lose time in organizing to deal with the problem.

While the immediate reaction of many chairperson/CEOs to this proposal is negative, we believe it is a critical factor in making boards more effective. In fact, we believe that in many boardrooms today such a leader is already recognized by management and the outside directors. This is a natural concomitant of responsibility for audits, compensation and nominations being placed in the hands of committees composed only of outside directors. The chair of one of these committees usually emerges as a leader of the outside directors. In other cases it may be the director with the most seniority or the one who is most respected by the other directors. Our proposal recognizes and gives form to what in many cases has emerged on a *de facto* basis, but does not compromise the leadership prerogatives of the chairperson/CEO.

We recognize the possibility that a lead director might attempt to usurp some of the functions of the CEO or might become so friendly with the CEO as to be a shield against appropriate evaluation of the performance of the CEO and when necessary the CEO being held accountable for poor performance. On balance we think that this risk should be accepted. We think effective leadership of the outside directors is essential to enable the board to discharge its monitoring function properly. Providing such leadership far outweighs the damage perceived by some chairperson/CEOs. Further, the risk of having a lead director is reduced by having (a) a smaller board with all members participating fully, (b) a term limit for directors, (c) a mandatory retirement age, and (d) most important, careful selection of outside board members. Finally, the risk can be virtually eliminated by rotating the lead director role among the chairs of the audit, compensation and nominating committees on an annual or biannual basis.

Improved Information

Even when directors spend more time preparing and discussing corporate issues, they still will need information which is superior to what they now receive in two senses. First, to carry out the monitoring of the corporation's performance in relation to its long-term strategic, financial, and organizational goals, directors need a broader array of data than the financial reports they typically now receive. That financial reports alone are inadequate for assessing corporate performance is not a new idea. As far back as 1951, Ralph Cordiner, then CEO of General Electric, asked McKinsey and Company to develop a broader set of measures for business performance. Several different classes of measures were recommended: profitability; market position; productivity; product leadership; personnel development; employee attitudes; public responsibility; and balance between short- and long-range goals. Earlier this year Cyrus Friedheim, Jr., Vice Chairman of Booz, Allen & Hamilton, proposed a similar list of measures as the basis upon which CEO performance should be judged in relation to compensation.

The specifics of the performance data supplied to the directors will vary depending on the company's business and the adequacy of its information systems. We recognize that the amount of this data could be overwhelming to outside directors, even with the increased time we have proposed they devote to their responsibilities. Hence, our second proposal apropos director information is that great care and attention be given to how data is organized and presented, with each board choosing (and reevaluating annually) the format it finds the most useful.

Corporate and CEO Performance Evaluation

The purpose of these broader data is not only to enable independent directors to be better informed in making decisions, but also to enable them to do a more thorough and meaningful assessment of the performance of their company and of its leadership. We believe the board's performance evaluation should be an explicit annual event. It should consist of three related aspects.

First, there should be an assessment of the company's long-term financial, strategic and organizational performance in relation to the goals previously established by management and the board. This assessment of company performance should also include an examination of the company's historical trends as well as its performance along these dimensions compared to competitors and/or similar companies. This assessment of company performance would be a critical part of the board's annual evaluation of the CEO's performance, the second aspect of the board's annual review of performance.

The independent directors' review of the CEO's performance is obviously a sensitive and delicate matter, which must be conducted with skill and tact. Many boards profess to do such an assessment, but we know of only a few companies that conduct a thorough and systematic review. The Business Roundtable says one of the primary functions of the board of directors is to "select, regularly evaluate and, if necessary, replace the chief executive officer." Because of the sensitivities involved we do not recommend any specific process. What will work in a particular company will depend on its business, size, history and culture, and the relationship between the CEO and the independent directors.

Nevertheless, we do have in mind certain broad guidelines which we believe are critical if the process of evaluation is to be helpful both to the CEO and the independent directors:

(1) The assessment should be based on company performance, and the progress the CEO has made towards his personal long- and short-range goals. Such personal goals would constitute the major extraordinary initiatives the CEO wanted to achieve, e.g., developing and selecting a successor; expanding into markets internationally; making a major acquisition; creating a significant joint venture. Short-term goals we envision being agreed upon annually between the CEO and the independent directors. The longer-term goals might have a three-to-five-year horizon, but would be reviewed annually and changed as necessary.

(2) Each director would make an individual assessment of the CEO's performance. These would then be synthesized to reveal the central tendency, as well as any range of views. This synthesis could be done

by the lead director, or by a small group or committee of independent directors.

(3) The CEO would receive this synthesized feedback in a confidential manner in which both he or she and the independent directors were comfortable.

(4) After the CEO has had time to reflect on it and to develop a response, he or she would then discuss his or her reactions to the assessment with all the independent directors. This discussion should also focus on any changes in goals for the company or the CEO which seem appropriate.

We believe that a careful annual assessment would accomplish several important objectives. For the CEO it would provide concrete data about how the independent directors assessed his or her performance and that of the company. Leaders of large companies rarely get such feedback, but they tell us it can be very helpful to them. For the independent directors such a process would enable them to share their ideas on the company's progress and on the CEO's performance. It would also provide a tangible basis for defining CEO compensation. Finally, this process would improve communication between the CEO and the independent directors as well as among the latter, which in itself is desirable.

We recognize that some companies may be concerned with the litigation implications of the annual CEO evaluation, however, we believe that the benefits, both substantively and as demonstrating discharge by the directors of their monitoring responsibilities, outweigh the possible misuse or misinterpretation of the evaluation in a lawsuit.

In order to avoid any misunderstanding or implication that the independent directors are meeting or conferring because of dissatisfaction with management, the CEO evaluation could take place at the same time each year. Some companies have adopted a practice of having the independent directors meet separately as part of several of the regularly scheduled board meetings, again to avoid any implication of a problem with management.

The third aspect of the annual performance evaluation is an assessment of how the board itself is functioning. Questions like the following should be discussed: Is the board satisfied with the information it is receiving? Is the lead director interfering with the management? Is there a director who does not participate fully in the board's activities? What can the board do to improve its own processes and performance?

The Board and Shareholders

Our focus so far has been largely on the relationship between management and the board. We now want to turn to the board's relationship to shareholders. As we noted earlier, shareholders, especially institutional investors, are searching for legitimate means to express their concerns about corporate performance. As we describe this facet of our proposal, we must emphasize that the term "legitimate" to us means shareholders should focus their attention on the financial and strategic performance of the company, and should not use the corporate governance arena to further social or political ends. Such activity only serves to exacerbate the tensions between shareholders and managers and directors, diverting the latter two groups from focusing on efforts to improve performance.

We recommend that the board of directors (including its management members) meet annually or biannually in an informal setting with five to ten of the larger investors in the company. The purposes of the meeting are to facilitate communication between the institutions and the outside directors and to avoid misunderstandings, particularly to dispel the views of some institutions that outside directors are not knowledgeable about the business of the company and are overly tolerant of underperformance.

The informal format of the meeting allows the institutions to talk to the directors both as a group and on a one-on-one basis. While senior management will be present, arrangements should be made to permit conversations between the institutions and outside directors without management, if the institutions so desire. In many cases it would be desirable to start the meeting with a presentation by senior management and then follow it with an opportunity for dialogue.

In view of the limited number of senior personnel available to institutional investors for the purpose of this type of meeting and the advantages of diversity, invitations should be rotated among the larger holders so that the same institutions are not invited regularly. Companies that are performing well may find that personnel constraints result in the institutions not accepting the invitations or asking that the meetings be scheduled on a four or five year basis rather than a one or two year basis.

Several arguments for not having these meetings have been advanced:

- they will result in the disclosure of material nonpublic information;
- they are an undue imposition on the time of the outside directors;
- they invite attempts at micromanagement by institutions;
- a few activist institutions will be "anointed" as having a special relationship with the company; and
- they discriminate against the small individual investor.

While there is some substance to each of these arguments, they do not individually or in the aggregate outweigh the advantages of these meetings.

The inside information issue is readily dealt with. The meeting can be timed to take place shortly after either quarterly or annual financials are issued. The "Management Discussion and Analysis" section of the financials should cover whatever might be of interest in the type of discussions that normally would take place. In large measure the procedures and safeguards that have been evolved for dealing with analyst meetings can be adapted for this meeting. Further, all participants in the meeting are aware of the inside information problem and are accustomed to dealing with it. Since only long-term institutional holders would have an interest in attending the meeting (short-term holders would have sold in the market as soon as underperformance was perceived), the attending institutions would, in addition to not seeking inside information, be willing to not act upon it if through inadvertence they received it.

The meeting and preparation for it will require that the directors devote additional time. A day for the meeting and a day for preparation are reasonable estimates. This is a small and worthwhile investment of time if it avoids the much greater amount of time consumed when a company falls out of favor with institutions and becomes the target of a proxy resolution campaign.

Almost all the institutions disclaim any desire to micromanage and there is no indication that there is any change in prospect. The institutions do not have the staff or the experience to evaluate management decisions or corporate strategies. Nor is it in their self interest to incur the significant costs to create such capability.

The concern with developing a special relationship with certain institutions is readily met by rotating the institutions invited to the meeting. Different institutions can be selected for each meeting. There is no need to invite back the same institutions each year. While it is easy to avoid the "anointing" problem, consideration should be given to developing special relationships with long-term institutional holders who will take larger stakes in the company and encourage the management to pursue long-term strategies. This is a key recommendation of Michael Porter in *Capital Choices: Changing the Way America Invests in Industry* and a number of other thoughtful students of corporate governance.

This type of meeting does not discriminate against the small individual investor. The format of the meeting is not appropriate for small individual shareholders and there is no reason to feel that all shareholders should have the same programs available to them. Most companies have special investor relations programs for small shareholders and small shareholders benefit from the meeting with institutional investors along with all shareholders, large and small.

Special Reports by Companies that are Underperforming

If the company's performance is satisfactory, the informal meeting with the large investors and the customary quarterly and annual reports, plus the usual pattern of management's meetings with analysts should provide adequate information to investors. However, when the company's performance is not satisfactory, we believe the company should provide investors with more information about the causes of the company's difficulties, and the actions the board and management are taking to correct the situation, than is normally provided in the "Management Discussion and Analysis" section of the company's periodic reports.

Specifically, if in three of the past five years a company has failed to meet its goals, or suffered losses or declines in earnings, or erosions in competitive positions, or has underperformed the market averages or its competitors or peer group of companies, a special section of the annual report should be prepared under the supervision of the independent directors. This special report should describe the causes of the problems and the actions the board and management are taking. This special report should be continued in subsequent annual reports until the problem has been rectified. While the special report is triggered only after at least three years of underperformance, we do not intend that this be considered a grace period for underperformance. A board should take action as soon as possible to deal with underperformance. Indeed, we believe that the possible future requirement of a special report will be a significant factor in motivating management and the board to take early action to deal with underperformance.

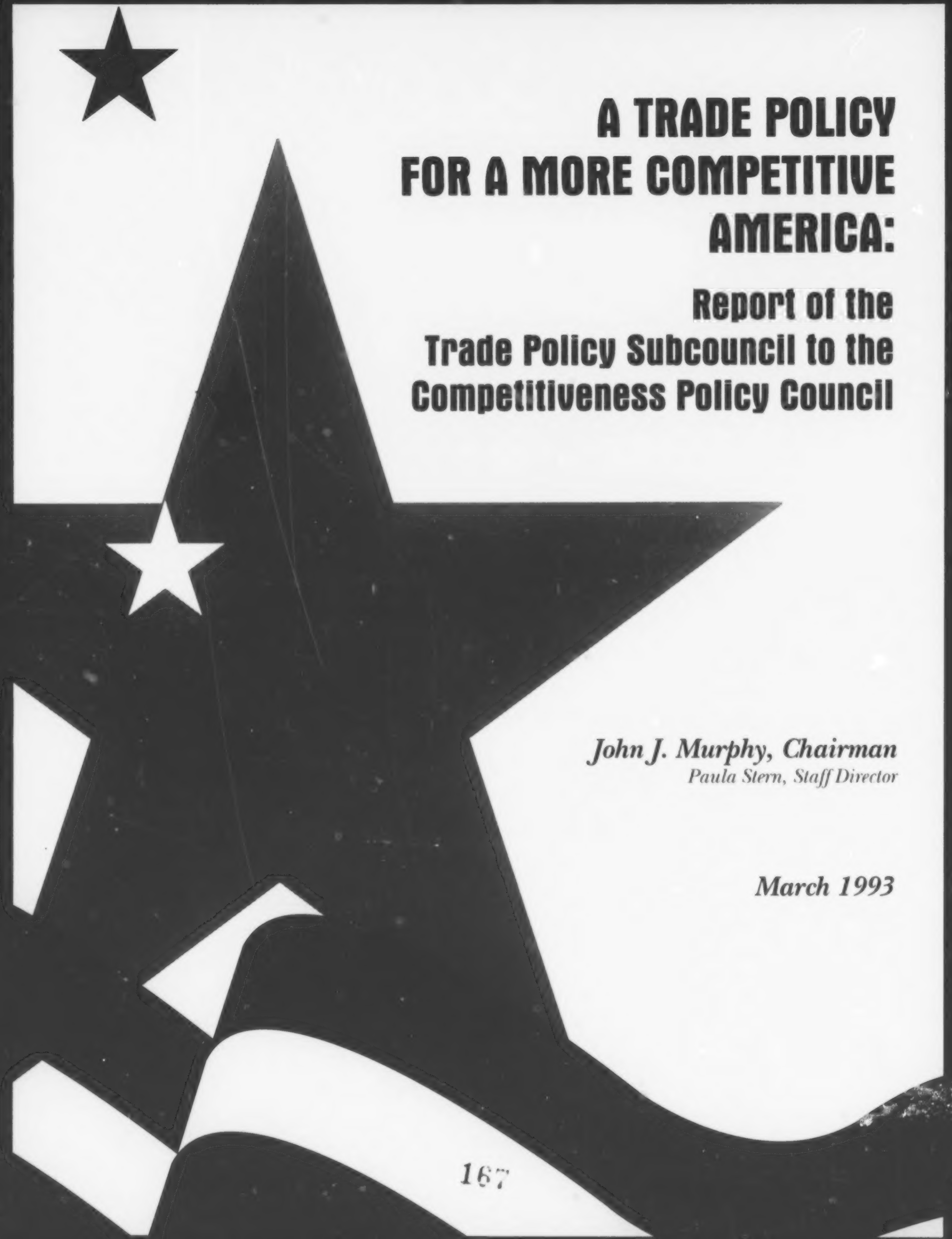
When a corporation's underperformance triggers the special report in the annual report, substantial shareholders should be entitled to voice their views through the proxy statement for the annual meeting. To provide this opportunity, the annual meeting should be rescheduled so that there is sufficient time after the mailing of the annual report for shareholders to determine if they desire to have their views included in the proxy statement for the meeting. Provided there is no proxy fight, up to three shareholders or groups of shareholders who individually or together have held 1 percent or more of the shares of the corporation for a year would each be permitted to include a statement of up to 500 words setting forth their views of the corporation's performance.

The performance reviews, annual meeting with large investors and special report to shareholders for troubled companies are central features of our proposal. We believe that these features will result in better monitoring and higher standards of accountability, and will provide shareholders with adequate information for purposes of communicating with management and the directors and upon which to make proxy decisions. These features put "teeth" into our proposal. A formal annual performance review overcomes the natural reluctance of directors to be critical of the CEO and requires them to focus on deficiencies that human nature might otherwise lead them to overlook. This review also assures correlation between performance and executive compensation.

Informal meetings in which large shareholders have the opportunity to communicate directly with directors will do much to promote understanding and most importantly will enable directors to assess better any concerns the shareholders may have. These meetings will also enable the directors to show the shareholders that the directors are aware of and dealing with major problems. Finally, we believe the requirement for a special report and postponement of the annual meeting in the event of persistent underperformance will be a significant factor in motivating management and the board to take action to deal with underperformance before it gets to the point of triggering the special report.

Conclusion

We believe that our proposal provides an effective means for improving corporate governance and thereby improving performance and the competitive position of companies. All of our proposal can be adopted by individual boards of directors with no more than changes in bylaws and boardroom procedures. We are convinced that moving in the directions we have proposed will strengthen corporate governance by making management more directly accountable to the board and, in problematic situations, improving shareholder communication with independent directors. Lastly, we believe that our proposal will reduce the growing tension between activist institutional investors and shareholder advocacy groups and corporations; eliminate much of the proxy resolution activity by institutional investors designed to impose their concepts of governance on companies; arrest the efforts for more federal regulation and legislation; and avoid a judicial shift away from the traditional business-judgment-rule review of board actions.



A TRADE POLICY FOR A MORE COMPETITIVE AMERICA:

Report of the Trade Policy Subcouncil to the Competitiveness Policy Council

John J. Murphy, Chairman
Paula Stern, Staff Director

March 1993

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COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

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Dear Fred:

With this letter the Trade Policy Subcouncil transmits its report to the Competitiveness Policy Council, fulfilling its mandate to make specific recommendations for a US trade policy that enhances US competitiveness both at home and abroad.

America in 1993 is standing on the threshold of a new era that requires a shift in American thinking on trade policy. Woven throughout this report are several fundamental principles representing the consensus of our 28-person Subcouncil with members from business, labor, academia, and the government. First, today's national security objective — almost as significant as winning the Cold War was yesterday — is the restoration of economic strength at home as a necessary precondition to ensuring US strength and influence overseas.

Second, trade must be viewed as a part of an overall competitiveness strategy that, by continuing to improve American productivity at home, will also assure American export viability in global markets. Chronic structural problems must be tackled by American firms and workers on the factory floor, in marketing, etc., while the government, in concert with the private sector, should provide leadership on such issues as infrastructure, education, retraining, investment, capital formation, and technological impetus. Third, the US government also has a responsibility to concentrate its political and diplomatic capital on trade initiatives that yield the highest dividends for the nation's trading position: global growth, competitive exchange rates, and market liberalization.

America's trade policy thinking must fundamentally refocus on an agenda for the 1990s and beyond. In the 1980s, US trade policy makers in Congress and the White House responded to massive import pressures by redrafting trade laws for import relief. US industrial preeminence was feeling the dramatic competitive effects of Japan's emergence as an economic superpower and the growing economic prowess of the newly industrialized economies of Asia. These Asian countries developed rapidly after World War II and their exports by the 1980s had established formidable beachheads in the United States, challenging some of America's leading industries. In the early 1980s, macro-economic disequilibria with our major trading partners, accompanied by an unfavorable exchange rate, exacerbated these pressures, resulting in hemorrhaging trade deficits. Consequently, trade policy in the 1980s emphasized trade *contraction* as a means of easing the pressures felt by US firms beleaguered by imports and rendered price uncompetitive by the overvalued US dollar. In the 1990s, however, a dynamic US trade policy agenda must focus on the *expansion* of trade, moving beyond a static view of the economy and of trade, even while provisions must be maintained to ease adjustments to changing competition.

Today, many of America's industries have sharpened their competitive prowess, and the exchange rate against most currencies no longer places US exports at a major disadvantage. As we face the future, however, much remains to be done. US trade policy should shift from the defensive — responding to the battering of the 1980s — and go on the offensive — reaching out for the opportunities that are now within our grasp. US trade policy now must focus its attention on laying the foundation for future prosperity through the dynamo of trade. Therefore, the central theme of this Trade Policy Subcouncil report is that the touchstone for US trade policy in the next decade should be enhancing American exports by expanding opportunities for US firms in a growing world market.

Achieving a consensus on a competitive, export-led trade strategy from over a score of individuals representing a range of interests is an achievement in and of itself. However, not only did the Subcouncil achieve a consensus, but it also plowed new intellectual ground by laying out an outline — consistent with President Clinton's first speech on international economic policy on February 26, 1993 — for shifting US thinking about the role of trade policy in the future. In short, the Subcouncil agreed that the challenges of today's economy must be faced by expanding trade and opportunities for US exports, not through contracting trade flows.

The Trade Policy Subcouncil staff reviewed, compiled, catalogued, and summarized a comprehensive range of viewpoints and the literature to date in order to assist in the formulation of policy recommendations by the members. From the outset of its deliberations, the Subcouncil placed trade policy in its proper perspective, viewing it as an instrument that must be integrated into a broader competitiveness strategy that will ensure that the American labor force and management are equipped to adapt and compete in a rapidly changing global economy. The Trade Policy Subcouncil then proposed ways to address the major foreign and domestic impediments to a reinvigoration of US export growth. The Subcouncil urges the new Administration and Congress to focus on: coordinating a global growth strategy in cooperation with our trading partners; expanding US export opportunities by reducing trade barriers worldwide; enhancing US export financing and promotion efforts; and reducing disincentives to exports at home.

Having transmitted our recommendations to the Competitiveness Policy Council, the Trade Policy Subcouncil has brought the ball to the goal line. What is needed next is an active outreach program to assure that this shift in thinking becomes a consensual framework within which Congress and the White House can work together to adopt a new trade agenda that will best serve America's national interests. This will require much discussion with all the interested parties in the private sector, in government at all levels, as well as with the media.

Sincerely,

John J. Murphy
Chairman, Trade Policy Subcouncil

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I. Introduction

The past decade has witnessed dramatic changes in the economic and power structures of the world. The most far reaching change in the economic sphere has been the increasing globalization and interdependence of economies. As this internationalization proceeds at a rapid pace, a major concern for the United States is to ensure that its industry and its people are competitive in the new economic order.

With the growing importance to the United States of the global economy, trade has become a central focus of the competitiveness debate. The persistent US trade deficit has become one of the most visible symbols of the economic challenges faced by America. For many people, our trade balance has become the measure of how we as a nation are adjusting to new economic realities. Despite attempts to simplify the competitiveness equation in this way, the ultimate test of America's competitiveness is the standard of living of its population, not the trade balance. Nevertheless, trade is an increasingly important component of our competitiveness.

The persistent trade deficit — which forces the United States to borrow abroad and builds up the nation's foreign debt — must be eliminated. Payment on the foreign debt may harm the US standard of living by shifting productive resources from the US to creditor nations. Moreover, the trade deficit increases pressures to restrict imports and pursue policies that may threaten the multilateral trading system on which we rely to keep foreign markets open. With this in mind, the Competitiveness Policy Council (CPC) mandated the Trade Policy Subcouncil to recommend policies to ensure that US trade policy enhances US competitiveness both at home and abroad.

The Subcouncil strongly believes that *trade policy alone cannot ensure US competitiveness*. Rather, it must be part of an overall strategy demonstrating a commitment at all policy levels to guarantee our future economic prosperity. The internationalization of the US economy has brought an awareness that the health of US industry is affected by both domestic and international factors, that in effect the two are intertwined. The search for ways to improve US economic performance, therefore, must focus on both the international and domestic fronts. On the one hand, even the most competitive US companies can be kept out of foreign markets, face unfair foreign trade practices, or languish when overseas markets are shrinking. On the other hand, it makes little sense to work on opening markets to US exports, promoting US exports, curbing unfair trade practices, and executing a global growth strategy unless the United States has products that are competitive both at home and abroad.

Therefore, proactive measures need to be taken at home to enhance US productivity and industrial performance. While a competitive trade policy must focus on expanding world markets through a global growth strategy, opening foreign markets to US goods and services, and curbing unfair trade practices, the success of trade policy is ultimately contingent on the competitiveness of US products and services. Fundamental differences in productivity, savings and investment rates are a major factor in the persistent trade imbalance of the United States. Proactive measures must be taken aimed at adequately addressing such issues as the education and training of a skilled US work force, capital formation, manufacturing, and technological impetus. These issues have been dealt with by other CPC subcouncils. To the extent that the recommendations of these subcouncils are adopted, they will ensure that American industries and workers are able to face the challenges of an increasingly competitive market both at home and abroad and thus promote US prosperity and security. Moreover, they may reduce the reliance on the import relief trade laws that may be sought by firms and workers injured by import competition.

In considering the best way to improve the US trade picture — and in particular to achieve the goal stated in the first report of the Competitiveness Policy Council to eliminate by 1995 the deficit in our global trade in goods and services (the current account) — the Subcouncil eschewed reducing the trade deficit through protectionism. Protectionism can benefit protected industries by raising prices and/or providing them with a larger share of the domestic market. However, this protection often comes at great cost to the rest of the economy, bringing inefficiency, lower incomes, and slower growth for the economy as a whole. Resources are diverted from more efficient sectors to the protected sectors, and industrial users and consumers ultimately suffer if the price of protected products rises.

Instead, *the Subcouncil has put greatest emphasis on enhancing US exports as a touchstone for US trade policy for the next decade*. An enhanced export performance would redress the foreign debt incurred in the 1980's as the US was forced to borrow abroad in order to pay for a huge trade imbalance. Moreover, it would establish a healthy source of new jobs in the US economy for the future. The strategy set out by the Subcouncil in this report focuses on enhancing US exports by:

- ▶ stimulating an "export mentality," concentrating on smaller businesses new to exporting;
- ▶ ensuring stability and growth in world export markets;
- ▶ improving government programs that enhance exports; and
- ▶ reducing export disincentives.

Why Export?

The importance of trade in the US economy has increased dramatically in recent years. Exports and imports of goods and services now equal one quarter of our entire gross national product. That ratio has doubled over the past twenty years and is now as high as in Japan or the European Community as a group. During the second half of the 1980's, export expansion became a driving force for the US economy and the only source of growth for manufacturing jobs. In 1991, exports of goods and services accounted for 11 percent of gross domestic product (GDP), up from 8.5 percent in 1980, and up substantially from the dollar-driven slump in export dependence of 7.2 percent between 1980 and 1985. Today, we export one quarter of all goods we produce.

There are at least three main reasons to export:

- ▶ growth in the economy;
- ▶ jobs with higher skill and wage levels; and
- ▶ numerous advantages to individual firms.

Growth in the Economy

Merchandise exports, which grew 66 percent between 1987 and 1991 to $421.6 billion, have become a driving force for the US economy. One of the only bright spots in the US economy in the past five years, in fact, has been export performance. From 1987 to 1992, export growth accounted for about 44 percent of US economic growth. Developments in more recent years demonstrate the importance of exports even more dramatically. Since 1989, exports have directly accounted for 93 percent of US economic growth, significantly softening the impact of economic slowdown at home.[2]

The importance of exports to the US economy is highlighted by the high level of export dependence as a proportion of production of a variety of different sectors in the United States in 1990 (the latest available data):[2]

- ▶ oil field machinery - 77 percent
- ▶ aircraft - 48 percent
- ▶ semiconductors - 42 percent
- ▶ mining equipment - 36 percent

- computers and peripherals - 36 percent
- construction machinery - 29 percent
- industrial/analytical equipment - 29 percent
- machine tools - 28 percent.

Exports and U.S. Employment

Exports are now crucial to the employment picture in the United States. Exports contributed 25 percent of the growth in US private industry jobs between 1986 and 1990. Particularly striking is the fact that *exports contributed almost all of the job growth in manufacturing industries, nearly offsetting the overall manufacturing job losses in the US economic slowdown through 1991.*[3] According to a recent Census Bureau report, exports supported more than one in six US manufacturing jobs in 1989.[4] In 1990, over 7 million Americans owed their jobs to exports, up from 5 million in 1986. The share of total jobs supported by exports rose to 7.5 percent in 1990 from 5.7 percent in 1986.[5]

Jobs supported by exports pay better than the average job. According to a recent US Trade Representative (USTR) study, workers employed in export-related jobs make 17 percent more than the average US worker.[6] Wages for manufacturing workers in export-related jobs averaged about 10 percent higher than the national average. A strong wage advantage for export-related service workers is particularly encouraging because most of the recent job growth in the US economy has been in the service sector.[7]

Another recent study concludes not only that export-related wages are higher than the national average, but that wages in import-sensitive industries are substantially lower — by about 16 percent — than the national average. Export-intensive industries in the United States employ more skilled workers and do more research and development than import-intensive industries. *The implication for the United States, therefore, is that policies that succeed in promoting trade and increasing exports will tend to raise welfare by moving workers from lower- to higher-wage industries.*[8]

Benefits to Firms

In addition to their macroeconomic importance, exports bring significant benefits at the firm level. By expanding the market for specific products, exports allow firms to spread fixed resource costs over a larger customer base, improving their overall return on investment. Exports also enhance the ability of US firms to compete domestically and overseas as they respond to innovations of foreign competitors and the demands of foreign customers. By exposing themselves to global competition, US companies are less likely to be caught unprepared by new developments affecting their industry. Moreover, by diversifying the market base of corporations, exports provide a cushion against business cycles which are often irregular from country to country and against volatile exchange rates. The result is that the corporation can more likely ride out slumps in one market without suffering irreparable harm, a situation of particular importance for many firms in the recent economic slowdown in the United States.

Exports act as both a measure and catalyst of the competitiveness of individual firms. Exposure to global markets — not only through exports, but through import competition as well — sharpens incentives to innovate, tightens firms' internal organization, and thereby enhances efficiency. In short, *firms that export are better equipped to compete both at home and abroad.*

A Long Way to Go

A major US policy goal, therefore, should be to encourage US firms to export and to create an environment, both domestic and international, that enhances US exports. Despite major gains in the last few years, however, the US trade record of the last decade is cause for alarm. The alarm is four-fold:

(1) The trade deficit — which ballooned in the 1980s and shrank after 1987 thanks to the dollar devaluation and strong global growth — is growing again.

(2) The sectoral composition of the US trade deficit shows some disturbing trends.

(3) The US share of world export markets has declined.

(4) Domestic disincentives deter billions of dollars in US exports.

1. Growing Trade Deficit

First, the persistent US merchandise trade deficit shows signs of expanding once more. The trade deficit grew 682 percent to $152.1 billion from 1981 to 1987, though it recovered 56 percent to $66.3 billion by 1991. In 1992, however, the deficit grew again to close to $80 billion. Of particular concern is the slowing rate of export growth, down from 28 percent in 1988 to 9 percent in 1991. In 1992 exports grew even more slowly while the pace of import growth picked up due to the resumption of domestic demand.

The principal cause of the widening trade deficit is the global slowdown in economic growth. Growth in the industrialized world has been anemic the last two years, and demand for US exports has stagnated. Moreover, while the United States appears poised for recovery, the near-term prospects in Europe and Japan are not good, and thus US exports to these important markets are unlikely to exhibit renewed growth. The demand shortfall in the industrialized world has been offset to some degree by continued dynamic growth in East Asia and Latin America. However, these positive trends cannot make up for the slow export growth in the major industrialized markets.

Trends in the exchange rate are another factor that will make it more difficult to continue the rapid rates of export growth we had experienced in the last five years. In the early part of the last decade, US businesses suffered the consequences of an extremely high dollar relative to the currencies of the other major trading nations. US companies had a difficult time competing in export markets, and were beleaguered at home by a huge inflow of imports. The fall in the US dollar exchange rate following the "Plaza Accord" in September 1985 reversed the adverse impact on US industries, allowing them once more to be price competitive in global markets. Subsequently, US exports boomed and US firms recovered much lost ground. This trend toward improvement has been diminishing, however, this past year.

While the post-Plaza Accord level of the US dollar has helped US industry to compete, export growth can expect little help from further depreciations of the dollar, which has remained relatively stable against other major currencies. In fact, because the US economy is strengthening while Europe's and Japan's economies stagger, there will likely be upward pressure on the dollar. An additional concern at present is volatility in exchange rates, such as the impact of the European monetary crisis experienced in 1992 and continuing to date. This volatility is introducing a large element of uncertainty among US exporters and foreign investors. However, with relative stability for the US dollar, the greatest factor influencing US export growth is now the slow growth of demand in overseas markets.

2. Composition of the Trade Deficit

Second, the sectoral composition of the trade deficit shows some disturbing trends. From 1981 to 1987, US industries were hammered as exports stagnated or declined and imports took market share in the United States. The United States has historically been a strong exporter of capital goods, defined as products used in the manufacture of other goods or the provision of services.[9] However, by 1987 the $46 billion surplus in capital goods the United States enjoyed in 1981 was gone. The deficits in automobiles and consumer goods were spectacular, climbing to a combined level of $130 billion. On top of this, agricultural exports — which had accounted for 18 percent of US exports in 1981 — fell substantially in volume and as a share of US exports.

There has been marked improvement in the trade balance over the last five years, accounted for primarily by sharply increased exports stimulated by a lower exchange rate and global market growth. The United States has recovered its substantial surplus in capital goods, due entirely to a doubling of exports. In non-petroleum industrial supplies and materials, the United States went from a deficit in 1987 to a surplus of around $20 billion in 1992 due to an increase in exports of $40 billion. Other sectors, however, have not recovered the ground lost in the early to mid-1980s, despite some improvement. Consumer goods exports have shown the strongest rate of percentage growth since 1987, and automotive exports have narrowed the trade deficit in that sector by 25 percent from the 1987 peak. However, these sectors are still characterized by huge deficits, and the combined automotive and consumer goods deficit in 1992 was close to the $130 billion record level. In agricultural trade the United States has maintained its surplus, but exports have yet to recover to 1981 levels while imports have grown. Agricultural exports now account for less than 10 percent of total US exports.

On the whole, the competitive improvement of the United States has been most pronounced in those industrial sectors best able to tap into global export markets during the period of a low dollar exchange rate and robust foreign growth that prevailed in the late 1980s. This is particularly true of the capital goods sector, which now accounts for almost 40 percent of US exports, and some elements of the industrial supplies and materials sector, particularly chemical and allied products.[10] The good news is that the US export share has remained stable in high-technology manufactures. Declining US export competitiveness is concentrated in medium- and low-technology manufactures.[11]

However, *an important issue of concern is the declining US share of world exports of finished goods*, down 4 percentage points from 1981 to 1990.[12] This trend suggests that US comparative advantage may be moving away from finished goods toward industrial supplies.[13] This shift, due largely to weak US investment relative to investment abroad, is disturbing because the outlook for demand for finished goods may be more promising than that for industrial goods.[14] In addition, persistently large trade deficits in consumer and automotive goods remain a problem.[15]

3. US Share of World Export Market

Third, *the US share of the world export market, an important measure of export competitiveness, has declined over the last decade.* The dramatic losses in global market share in the early 1980s due to the appreciation of the dollar have not been fully recovered. However, US multinationals and their majority owned firms have held their ground in global export markets with a stable market share of 17 to 18 percent for over two decades.[16] Shares lost by US-based parents have been gained by foreign affiliates.

If US firms are competitive but the United States as a country is not, this suggests that national solutions must be found that go beyond what management can do at the firm level and what the government can do at the international level. Broadly speaking, this Subcouncil addresses initiatives to stimulate and stabilize world markets abroad and to remedy national problems that reduce export competitiveness at home. In the latter category — domestic solutions — the Trade Policy Subcouncil specifically addresses the creation of an export culture among US businesses, export controls, and insufficient export financing in this report. Other issues, such as inadequate education, skills, productive capital formation, and technological impetus are addressed by other Subcouncils.

4. Domestic Disincentives to Exports

Fourth, while the recent debate over US competitiveness has largely ignored the issue, domestic disincentives to US exports deter billions of dollars in sales and thus rival many other elements affecting US competitiveness in importance. A forthcoming study estimates that US exports foregone due to US export disincentives could be as high as $30 billion annually.[17] Particularly important disincentives are inadequate export financing and poorly conceived export controls. Other export disincentives include inadequate export promotion services and restrictive tax, product liability, and antitrust policies. Not only do these disincentives cause US firms to lose export sales, but they often lead US firms to establish manufacturing facilities abroad in order to circumvent domestic export disincentives.

II. Ten Points to Making a Trade Policy for a More Competitive America

As noted above, the objective of the Subcouncil is to ensure that trade policy enhances the competitiveness of US industry both at home and abroad. After extensive consideration, the Subcouncil came to a consensus on the following major recommendations:

1. *Stimulate an "export mentality"* by concentrating on the untapped export potential of *small and mid-sized businesses.*
2. Coordinate world growth strategies and exchange rate policies to *ensure expanding markets* for US exports and to *maintain a competitive level for the dollar* that allows US goods to compete in world markets and reflects the US current account position.
3. *Open markets* for US exports through multilateral, regional, and bilateral negotiations, with particular attention to concluding the Uruguay Round.
4. Enhance government programs to *promote and finance trade* with both public and commercial funds.
5. *Reduce export disincentives*, particularly by streamlining the export control regime.
6. Ensure that *trade laws* are focused on enhancing US competitiveness and expanding export markets.
7. *Streamline* the trade *bureaucracy*.

The following is an elaboration of the Trade Subcouncil recommendations. The major topics are (1) creating an export culture; (2) world growth and exchange rate coordination; (3) trade negotiations; (4) export financing; (5) export promotion; (6) export controls; (7) other export disincentives — including tax policy, product liability law, and antitrust laws; (8) trade laws; (9) foreign investment; and (10) revamping the trade bureaucracy.

1. Creating an Export Mentality

Relative to our global competitors, the US commitment to exports is weak. The clearest indication of this is that the export component of the US economy falls far short of the export component of the economies of our major trading partners. In the United States, merchandise exports accounted for 7.3 percent of GNP in 1990, up from 5.5 percent in 1985.[18] The average for Germany, Japan, the United Kingdom and Canada in 1990 was over 18 percent.[19]

At present, too few US firms export. Only 10 percent of US firms are regular exporters. A few large firms account for the bulk of US exports, despite the fact that 90 percent of US manufacturers are small and mid-sized firms. A recent study by the Census Bureau found that in 1987, 50 companies accounted for 43 percent of all US exports, and 15 percent of exporting firms accounted for 85 percent of all exports. These figures suggest a large potential for export growth, particularly among small and mid-sized companies. It should be noted, however, that many smaller US companies are indirect exporters as components suppliers of "big ticket" exports such as airplanes.

Small and medium-sized businesses — which are now less likely to export — should be the focus of efforts to promote an export mentality. To reach more small and medium sized businesses, infrequent exporters should be targeted in export promotion efforts. In a Commerce Department 1989 strategic study review, infrequent exporters were defined as entities who have a desire to export, but that neither have the means or know-how to be regular exporters.[20] Over 85 percent of US exporters fall in this category. At the same time, current exporters must be encouraged to become even stronger in international markets, and to become better represented in unserved markets. Large companies, in particular, should not be taken for granted. While larger firms account for most US exports, there is still much room for improved export performance by these firms. Hence, promoting an export mentality requires widespread acceptance among firms of all sizes of the desirability and feasibility of exporting.

Though much work remains to be done, there are encouraging signs that an export mentality is beginning to develop among US businesses. During the recent economic slowdown from 1989 to 1992, in particular, small US firms have turned increasingly to export markets, and small localized exporters are marketing to a wider array of destinations.[21] It is still premature to determine whether these trends will continue and significantly improve US export competitiveness, but it is clear that these trends must be encouraged.

Recommendation

▶ *The Subcouncil urges the new Administration to stimulate an "export mentality" by concentrating its resources — such as export financing and export promotion programs, and the attention of federal trade officials — on the untapped export potential of small and mid-sized businesses while encouraging current exporters to become even stronger in international markets.*

2. World Growth Strategies and Exchange Rate Coordination

The economic vitality of the United States depends more than ever on economic conditions abroad. The greatest threat to US export performance is the current economic slowdown affecting most of the industrialized nations of the world. With both the Japanese and German economies in recession, US export growth to industrialized countries has slowed significantly in recent months. US export performance is also threatened by the possibility that the dollar value relative to other currencies would climb to uncompetitive heights, as it was in the early to mid 1980s, hobbling US exports and rendering US companies vulnerable to import competition in the US markets. Of particular concern is the current undervaluation of the Japanese yen.[22]

Slowing export growth is contributing to recent trends in America's troublesome trade deficit. Some have advocated policy responses to deal with the persistent trade deficit which emphasize trade policy, especially import protection. Such trade measures, however, are both a limited part of the problem and a relatively limited help in solving it in a dynamic and healthy way. *The US trade deficit, instead, is caused primarily by macroeconomic factors and demonstrably can be corrected by changes in macroeconomic policies.*[23]

The deficit soared during 1982-87 when US domestic saving (both public and private) dropped sharply, Japan steadily reduced its budget deficit, developing countries staggered under the debt crisis, and the unsustainably high exchange rate of the dollar harmed US industries' operations both abroad and at home. The US trade deficit has declined sharply since 1986-87 after a coordinated currency correction of September 1985 known as the Plaza Accord, Japan's subsequent period of rapid expansion of domestic demand (which diminished by 1991), and the resumption of growth in the developing world. However, the US trade deficit has begun to grow once more as Japan and Europe languish in recession, US domestic demand is beginning to rise, the yen has once more become substantially undervalued, and the dollar appears to be appreciating against the German mark.

This experience underlines the critical importance of improving both the macroeconomic policies of the major developed countries and the process of macroeconomic and exchange-rate policy coordination between them. The United States and its G-7 partners were forced into such cooperation to resolve the crises that were triggered by previous imbalances—in and around the Smithsonian Agreement in 1971, the Bonn Summit in 1978 and the Plaza Accord in 1985. A much better and more systematic approach in this area is essential in the future.

Improvement in the trade balance via dollar devaluation, however, can be a palliative that does not get to the basic problems—be they macro or microeconomically derived—which create the trade imbalance in the first place.[24] It is clear that more fundamental differences in productivity, savings and investment rates have much to do with the trade imbalances that still so sharply color US relations with countries, such as Japan, which maintain large trade surpluses with the United States. Therefore, proactive measures aimed at adequately addressing issues such as the education and training of the US work force, capital formation, and technological impetus must be taken, as referenced above.

Domestic policies to enhance American economic performance must be implemented in tandem with policies that expand international trade, promote a competitive exchange rate for American business, and ensure growing markets abroad through coordination of growth strategies among the major industrialized nations. These policies will foster a permanent export mentality in American industry and energize American firms to invest domestically — and thus create jobs — to meet demand abroad, and thus ensure the continued growth of US exports as well as the competitiveness of US industry in the US markets.

Recommendations

▶ *Encourage New G-7 Initiatives to Sustain Growth of Global Markets and to Maintain a Competitive Exchange Rate for the Dollar* — The Subcouncil urges the new administration to work with our G-7 partners to reform systematically the institutional framework to improve coordination on growth and exchange rate policy.

- *Global Growth Strategy* — Encouraging faster world-wide economic growth may be the best way to promote the continued growth of US exports. A global growth strategy should be developed by the G-7 for the long term. In the short term, additional fiscal stimulus should be encouraged in Japan, where the budget is in a sizable surplus, and fiscal tightening should be encouraged in Germany, which would facilitate lower interest rates in Germany itself and throughout Europe.
- *Exchange Rate Coordination* — The G-7 should build upon the "reference ranges" installed at the Louvre Accord in 1987 to maintain a competitive level for the dollar that allows US goods to compete in world markets and reflects the US current account position. In particular, the yen's current undervaluation must be addressed. There must be a clear United States commitment to avoid a repeat of the 1981-85 neglect of the relative value of the dollar which was a disaster for US trade. To support such a commitment, the United States must address the budget deficit to sustain low long-term interest rates and a competitive exchange rate for the dollar.

3. Trade Negotiations

Exports are now a major driving force of the US economy, and continued healthy economic recovery in the United States depends on expanding export markets for US products through market opening initiatives. American firms must have access to worldwide markets, which are three times as large as the US market in the aggregate. Next to promoting a global growth strategy, trade negotiations are the most important means of expanding world markets for US exports.

In the post-war period, trade expansion has served as an engine of growth that has benefitted the United States and the entire world. This expansion was spearheaded by the United States primarily through multilateral agreements under the auspices of the General Agreement on Tariffs and Trade (GATT). The GATT system has created rules to promote freer trade while allowing countries to safeguard their vital industries, provided common reference points to distinguish what constitutes an unfair trade practice, and has reduced the tendency to resort to exclusive or discriminatory bilateral or regional trading blocs. Moreover, GATT commitments are a buffer against the pressures from particular domestic industries to push for market restricting measures that enhance one industry's market strength at the expense of national competitiveness and living standards.

However, much remains to be done. Restrictions to US exports persist in many markets around the world. In addition, new rules are needed covering a wider range of subjects, such as services (including financial services), intellectual property, subsidy practices, and dispute settlement procedures.

The major goal of US trade negotiators should continue to be to ensure access to foreign markets for US exports and to create a stable and favorable international business climate. This goal is best achieved through multilateral negotiations — under the rubric of the General Agreement on Tariffs and Trade — aimed at market liberalization and the promotion of greater international cooperation on economic issues. In certain circumstances, however, regional and bilateral initiatives can be effective mechanisms to attain US trade goals. Such initiatives can be especially useful to move beyond multilateral rules and help push for faster global progress in trade and services liberalization.

Recommendations

▶ *Uruguay Round Wrap-Up* — The Uruguay Round of GATT negotiations is in its seventh inconclusive year. The United States stands to gain greatly once the Uruguay Round achieves the GATT objectives to liberalize further market access, to extend GATT coverage to new areas such as services, investment, intellectual property, and agriculture, and to improve dispute settlement provisions. The Subcouncil calls for the successful conclusion of the Uruguay Round of GATT negotiations at the earliest possible date.

▶ *Post-Uruguay Round Agenda, Including Trade and the Environment* — Although the Uruguay Round will significantly expand the scope of trade-related activities covered by GATT rules, many trade issues — such as rules governing foreign investment — will remain unresolved. Another major issue is the relationship between trade and the environment. Conflict between environmentalists and the trade community could be a threat to the GATT and US environmental laws. This conflict, however, is largely unnecessary. The goals of freer trade and environmental protection can very often be coexistent and mutually reinforcing. The Subcouncil recommends that the United States adopt a more constructive and progressive stance on the intersection between trade and the environment in international fora and aggressively work to see that our trading partners do so as well, particularly in a post-Uruguay Round multilateral trade negotiation.

▶ *Regional and Bilateral Market-Opening Negotiations* — While multilateral agreements are the ideal, they should not be the only option available to the United States. Regional and bilateral negotiations can have important market expanding effects. They can complement multilateral agreements by achieving deeper cuts in trade barriers with willing trade partners, or inducing recalcitrant trading partners to comply with GATT agreements. Moreover, if the Uruguay Round of multilateral negotiations do not reach a timely and successful conclusion, regional and bilateral mechanisms can be used to accomplish goals that have eluded the multilateral process. The regional NAFTA negotiations have gone further than the GATT in achieving agreement on such issues as intellectual property rights, investment and government procurement. To the extent that such negotiations result in agreements that the US approves, provisions must be made for environmental protection and labor adjustment.

The bilateral Structural Impediments Initiative (SII) with Japan has had some important market opening effects. The SII represents a minimal, yet positive, first step towards spanning structural differences between the United States and Japan. One of the main defects of the SII has been its transitory nature. Because the initiative deals with long-term problems, a long-term framework is needed for negotiations and action. The Subcouncil recommends that the SII framework be revamped and reinvigorated, particularly with respect to antitrust and competition policies.

▶ *Use of Section 301* — Section 301 should be forcefully pursued in cases where US exports are being harmed by the unwillingness of trading partners to remove trade barriers or comply with international trade agreements. In most cases, Section 301 actions — which permit the USTR to impose retaliatory measures against foreign countries that deny fair and equitable access to their markets to the detriment of US businesses — have led to negotiated settlements favorable to US businesses by opening foreign markets to US goods and services and protecting US intellectual property. A recent study found that the forceful use of Section 301, as it has been employed to date, has produced modest trade gains for the United States and has not measurably increased the risk of costly trade wars.[25] Actual retaliation has been rare and usually reflects a failure to achieve a negotiated objective. Hence, Section 301 should be used as a tool to achieve US goals for a comprehensive market-opening strategy in line with an overall trade and industrial strategy which takes into account US international agreements. By the same token, the US ability to take 301 actions where no international rules exist should not be constrained by undertakings at the Uruguay Round. Section 301 action should target sectors on the basis of their importance to US competitiveness and their relevance to a wide range of US products and services.

4. Export Financing

Once access to foreign markets has been attained, *export financing can play an important role in enhancing the competitiveness of US products and in attracting US firms to exporting.* Export financing provides competitive financing, loan guarantees, or insurance to help US businesses close export deals. It is particularly important for US exporters because it permits them to compete with foreign firm's exports financed by foreign official export credit agencies.

However, US export credit programs are inadequate compared with those of our major competitors and cannot meet the demand for financing from US exporters. The export credit programs of the Export-Import Bank of the United States (Eximbank) — the primary federal agency providing export credits — and other providers of export credits such as the Department of Agriculture and the Small Business Administration, support less than 5 percent of total US exports.[26] In contrast, Japan's export credit programs support 49 percent of Japanese exports, while 11 percent of exports are supported in Italy, 10 percent in France, 8 percent in the U.K., and 6 percent in Germany.[27]

The low level of funding for export credit programs in the United States demonstrates the low priority that has historically been placed on exports in the United States. More importantly, inadequate funding results in the loss of American exports and jobs. According to one ongoing study, inadequate export finance programs are an important export disincentive which may cost the United States as much as $5 billion in exports each year.[28] US capital goods exports are especially disadvantaged, particularly in projects where private financial markets are inadequate (such as public infrastructure projects in developing countries) and where US competitors have government financing programs that help cinch export sales.

Eximbank's budget must be sufficient to satisfy rising demand for credits, loan guarantees and insurance each year. As markets for US exports continue to grow in Latin America, Asia, Eastern Europe, and the former Soviet Union, demand for Eximbank services is on the rise. In 1991, the value of exports assisted by the Eximbank rose 28.7 percent to $12.1 billion, the highest level since 1981. In that year Eximbank was unable to meet all the demand for support of US export sales and deferred $250 million in additional requests until the 1992 fiscal year. In 1992, the Eximbank carried over about $400 million in authorizations into 1993.[29] The Eximbank's goal is to assist the doubling of US exports in the next five years, but current financing levels are inadequate to the task.

Demand for Eximbank services in 1993 could be as high as $20 billion, requiring approximately a $1.2 billion subsidy. For fiscal year 1993, however, Congress authorized only $757 million in credit subsidy, with an activity limit of $15.5 billion on Eximbank financing, while the ceiling on the bank's outstanding aggregate loan, guarantee, and insurance authority for the next five years was raised from $40 billion to $75 billion.

Eximbank's administrative budget is also inadequate. For fiscal year 1993, Congress authorized $45.6 million for administrative expenses, representing an increase over fiscal year 1992 of 14 percent in administrative expenses, less than the 22.5 percent increase requested by the Bush Administration. Without an adequate increase in its administrative budget the Eximbank will be unable to meet effectively the steadily rising demand for its services, especially from small and mid-sized companies.

In particular, more personnel is needed to ensure that applications for assistance can be processed in a timely manner, a matter that is especially important for smaller enterprises. Because competitiveness for exporters often hinges on their ability to meet demand for their products in a timely manner, Eximbank delays can hinder the ability of US exporters to compete globally. The Eximbank has increased productivity to maintain its turnaround time in the face of rapidly rising demand and increasingly complex programs. However, without additional personnel and financing Eximbank services will surely deteriorate.

For example, the rapid growth of the working capital guarantee program has not been met with any increases in personnel dedicated to the program. The same is true of the Eximbank's export insurance program — the single largest Eximbank program — which has now been brought in-house with the cancellation of a contract for its administration with the Foreign Credit Insurance Association. The Eximbank must work more aggressively with insurance brokers and its regional offices to better market its insurance services, and it must dedicate more resources to prevent a deterioration in the turnaround time for processing applications.

Even if the Eximbank's budgetary problems are solved, however, Eximbank efforts will not be sufficient without significantly more commercial bank involvement in export financing. This involvement dropped sharply with the sovereign debt crisis in Latin America and Africa in the early 1980s and has yet to recover fully. Smaller exporters, in particular, find it difficult to obtain export financing from commercial banks. A solution to this problem, by reducing the risk to smaller exporters, would induce more export involvement by more firms.

Another important issue that must be addressed is tied aid financing. US exporters have long been at a disadvantage against foreign competitors which have had access to developing markets through the aid programs of their home countries. The United States must have a strategy to induce its trading partners to enforce the provisions of the Organization for Economic Cooperation and Development (OECD) agreement covering tied aid finance and "mixed credits" that blend commercial-type financing with development lending. In addition, the United States must commit resources to enable US firms to compete in those areas which have been allowed in the agreement. While the OECD agreement must be given time to demonstrate its potential capacity to reduce the use of subsidies, the Eximbank must be armed with adequate resources to match other governments' offers and be pro-active where appropriate to position US exporters in key markets.

In short, the rapid growth of US exports has sharply increased the demand for all types of export financing in recent years. Current programs, however, are unable to fully meet that demand. The Subcouncil recommends that the quality and quantity of US export credit support be increased sharply with the following measures:

Recommendations

- *Increase Eximbank's budget* — In order to ensure that Eximbank has sufficient budget authority to meet the demand for export financing, the Subcouncil recommends $20 billion in Eximbank program authority for fiscal year 1994, requiring approximately a $1.2 billion subsidy. The Subcouncil also recommends a substantial increase in the administrative budget of the Eximbank. More staff must be dedicated to the administration of current programs in order to ensure that they are run efficiently by avoiding delays in processing applications. Until this problem is addressed, additional funding authority cannot be used effectively.
- *Engage Commercial Banks in Export Financing* — The recent Eximbank charter renewal requires the Eximbank to support commercial bank involvement in its export financing operations. In order to carry out this mandate effectively, the Eximbank should aggressively pursue a delegated authority program for commercial banks with which it has an established working relationship. This measure — which would allow selected commercial banks to provide Eximbank services directly, bypassing the overburdened Eximbank bureaucracy — would benefit US exporters both by reducing the turnaround time for processing applications and by providing a national network for Eximbank services. In addition, the Eximbank should aggressively promote the "bundling program", which has a significant role in expanding exports from smaller businesses.[30] Private pension funds and other institutional investors should be encouraged to invest in these Eximbank-backed securities floated by commercial banks to encourage US export activity.
- *Strengthen the US Response to Subsidized Exports by Trading Partners* — The United States must aggressively enforce the OECD agreement. The Eximbank's tied aid War Chest should be adequately funded and used strategically to this end. For fiscal year 1993, Congress authorized $200 million for the War Chest. However, under the current arrangement aggressive use of the War Chest would diminish Eximbank's direct credit role because funding for the War Chest comes out of Eximbank's total authority for direct credit subsidy of $757 million.

The US government also must be prepared to engage in tied aid projects that are allowable under the new agreement. In particular, capital projects capability — which promotes US exports of capital equipment — should be strengthened, as should the Commodity Import Program of the Agency for International Development (AID), which generates US exports as it assists nations with balance of payments difficulties to maintain imports of critical equipment and materials.

5. Export Promotion

Export credit agencies depend on export promotion to ensure that their programs are accessible to all US exporters, including small and mid-sized firms. The Eximbank, with only 350 employees and a very limited regional network, relies on the export promotion programs of other government agencies to deliver its services. In addition to their role in providing export financing, export promotion programs are effective when firms lack export awareness, when they lack the technical expertise to take advantage of export opportunities, and when US firms need representational assistance in opening doors overseas.[31]

Like export financing, export promotion programs are underfunded and understaffed in comparison with our major trading partners. A recent GAO report found that in 1990 the United States spent $0.59 for every $1000 of exports in non-agricultural export promotion, while France spent $1.99, Italy $1.71, and the United Kingdom spent $1.62. The United States also ranks at the low end in the number of overseas export promotion staff per billion dollars in exports, with 1.56 persons, while the United Kingdom maintained 8.05 persons per billion dollars in exports, France 5.87, Italy 4.14, and Germany 2.28.[31]

Moreover, existing government export promotion programs are an inefficient bureaucratic maze confusing to exporters and government officials alike. Ten federal agencies operate over 150 export promotion programs.[33] However, these programs are not funded on the basis of an explicit government-wide strategy or set of national priorities. The lack of a clear strategy and a clear locus of leadership leads to funding imbalances, duplication, lack of coordination, and competition among the numerous federal agencies involved. The clearest indication of the funding imbalance is that the Department of Agriculture received 74 percent of outlays for export promotion in 1991, and 45 percent of outlays for loans and guarantees, even though agricultural goods only constitute about 10 percent of US exports.

Both the Department of Commerce's United States & Foreign Commercial Service (US&FCS) and the Small Business Administration (SBA) maintain networks of field offices in the United States specializing in export promotion assistance, but the GAO found that the two agencies often are attempting to serve the same client base. The ability to provide exporters with access to federal export financing programs is limited, in turn, by the small number of Eximbank field offices, by the inability of US&FCS field offices to approve Eximbank or other federal agencies' export financing, and by the limited use of SBA's export financing program. Overseas, the situation is becoming increasingly confusing as the State Department and AID compete with the 134 US&FCS export promotion offices, creating friction in some overseas markets over who is in charge of providing export promotion services to US businesses. In addition, more states are getting involved in export promotion, and little effort has been made to date to coordinate state and federal programs.

A solution to current problems in export promotion must start with the development of a coherent strategy at the highest level and a commitment to enhance the overall competitiveness of the United States. While export promotion programs will not solve America's economic problems, they can play an important role in increasing exports in sectors in which the United States is competitive. In order to facilitate the development of an effective export promotion strategy, and in order to improve the delivery system for export promotion services, the Subcouncil recommends that the following measures be adopted.

Recommendations

▶ *Develop a Coordinated Export Promotion Strategy and Bureaucracy* — Many of the problems can be resolved by establishing a clear strategy and a clear locus of leadership that would reallocate resources to reflect new priorities. The Subcouncil is encouraged by recent legislation establishing a statutory basis for the Trade Promotion Coordinating Committee (TPCC), but it also recommends structural modifications, as appropriate, to raise the government's awareness of and involvement in overall economic priorities. Working within the framework of the new National Economic Council, the TPCC should establish a coherent strategy and clear priorities among the 150 current export promotion programs scattered across ten different agencies. Redefining the missions of the Department of Commerce and the USTR to focus on export growth may help focus policy makers in the bureaucracy. And organizationally, the Subcouncil recommends integration of export promotion into one unit and locus to assist would-be exporters to access government services.

▶ *Adopt a Single Budget Function for Export Promotion* — The creation of a single budget function would bring together all export promotion resources. By highlighting aggregate spending on export promotion, this measure would permit an assessment of whether current funding levels for export promotion are in line with overall US competitiveness goals and would facilitate a more efficient allocation of resources.

An important step towards resolving problems in US export promotion is 1992 legislation mandating the TPCC in the US government to establish a comprehensive strategy for export promotion and a unified budget to allocate resources according to the priorities established by that strategy. An immediate first step to implementing the objective of Congress of ensuring that funding for export promotion reflects today's economic priorities would be to direct the Office of Management and Budget (OMB) to create expeditiously a single, cross-agency budget function for export promotion budgeting. This measure would be consistent with the mandate of the TPCC, but at the same time would ensure a single budget for export promotion regardless of the future of the TPCC. The OMB should be instructed to consult with Congress to create a new budget subfunction for export promotion.

▶ *Increase the budget for export promotion* — Current funding for export promotion throughout the government is inadequate. This level is far below that of our major trading partners, and does not reflect the new economic priorities of the United States in the post-Cold War era. The Subcouncil recommends a substantial increase in the export promotion budget — if necessary, doubling it over the next five years — to be allocated according to the priorities established by a comprehensive strategy for export promotion which tracks a clearly defined geo-economic strategy for the United States in the post-Cold War era.

▶ Improve the export promotion delivery system at home and abroad:

- *Integrate promotion and finance functions* — More US programs should be brought to exporters at the local level by including a broader range of facilities at a single point of contact. The Commerce Department's export promotion arm, the United States & Foreign Commercial Service (US&FCS), was mandated in 1992 legislation to strengthen one-stop-shopping centers for export promotion programs. However, the US&FCS is underfunded and understaffed, and will therefore be unable to fulfill adequately this mandate. The Subcouncil calls on the export financing agencies, including the Eximbank and the Small Business Administration (SBA), to provide training and personnel for regional single points of contact.

- Industry association resources should be tapped. These organizations are accustomed to pursuing goals and programs in which member-companies work closely together. Moreover, *industry associations, with their sharp focus on special market niches, are positioned to customize all services offered in the export arena, including market research, trade promotion events, and development of overseas networks.* The associations have a built-in distribution system, staff and financial resources of their own, and an existing presence in overseas markets to bring to a partnership. Small and medium sized businesses, in particular, would benefit from this approach. Industry associations should be actively encouraged to participate in training programs on export finance and export promotion. In particular, the Subcouncil recommends that Eximbank training programs be extended to local and state chambers of commerce and industry association staffs.

- A local guide to export resources should be made available in every state and widely distributed.

- State government efforts, which focus on smaller and mid-sized exporters, are rapidly expanding and should be encouraged and coordinated with federal programs. States can better assist smaller exporters because they have the advantage of being close to the exporter and are able to evaluate the company's ability to perform. Eximbank should expand its delegation of authority to state governments, so that the credit analysis process is carried out close to the exporter. Eximbank should also explore ways to reinsure the state programs to enhance their capacity. In addition, it should use the recently absorbed five regional offices of FCIA Management, the New York-based company that was delivering Eximbank's export credit insurance program, to work closely with state government programs.

- US government representation abroad must be reoriented to focus on advancing US economic interests. Embassies must work closely with the US&FCS and be staffed with highly qualified personnel who are prepared to assist US businesses abroad in countries where the US&FCS is not present. To this end, the participation in government representation abroad of executives with extensive international experience should be encouraged. The primacy of commercial diplomacy must be reflected in a new emphasis on economic and business interests at all levels of the State Department. Opening markets to US businesses, promoting exports, and eliminating unfair trade practices should be among the highest priorities of US ambassadors.

6. Export Controls

Unlike most countries, the United States treats exporting as a privilege, not a right, forcing US exporters to comply with multiple statutes administered by at least a dozen Cabinet level departments and agencies. Between 30 and 40 percent of US manufactured exports require some form of written permission.[34] In order to obtain that permission, exporters must negotiate a time consuming and costly maze-like system confusing to exporters and officials alike.

Clearly, there are legitimate national security reasons for export controls. However, *the current overly restrictive and bureaucratic export control system is a major export disincentive, costing billions of dollars in US exports and harming the competitiveness of the high technology industries on which US national security depends.* The National Academy of Sciences conservatively estimated in 1987 that the annual direct cost of export controls to US businesses ran upwards of $9 billion.

The export control system must be made more effective, reflecting changes in both the security threats to the United States and changes in the global economy. With the end of the Cold War, the rationale for US export control policy — like many other policies devised for the Cold War era — must be redefined. The United States can not afford to penalize its own economy with unilateral controls that were conceived to function in an entirely different world when the United States had the predominant technology lead. Instead, the United States position towards export controls must reflect a highly pragmatic, multilateral approach. The key criteria should be foreign availability, controllability, and substitutability, and the United States should ensure that the control regime reflects the rapid pace of technological evolution. This is essential in obtaining the support of business leaders for export control policies, in achieving greater efficacy from export controls, and in eliminating unnecessary damage to the US economy.

Recommendations

▶ *Fundamental Reform of Both US Export Control Policy-Making and Administration* — Multilaterally imposed controls should be the norm since only multilateral controls are effective in today's economy in which no one country or firm is likely to possess a monopoly on a given technology or product category for long. Instead, the goal should be to broaden the membership of multilateral control regimes and to sharpen significantly the focus of the controls on technologies that are critical for chemical/biological, nuclear, or missile proliferation efforts. To this end, the following reforms should be enacted:

- Transform the Coordinating Committee on Multilateral Export Controls (COCOM) from a West-East export control group to a Critical Technologies Export Advisory Group. The group would maintain regularly updated lists of proscribed end-users — both countries and projects — and of those goods and technology whose export to those end-users would pose a direct threat to the security interests of the group or a member thereof.
- Unilateral US export controls should be strongly limited. A single set of export controls focusing on national security and enforced multilaterally should be the goal.[35] Export controls should be consistent with the advice of the Critical Technologies Export Advisory Group. This would benefit US industry by prohibiting the imposition of export controls on goods that are available from other sources and ensuring the effectiveness of the control efforts.
- Export control administration should be consolidated into one federal agency, preferably the Department of Commerce. Legislation to accomplish this purpose must be passed during the 103rd Congress. It is important that the legislative authority underlying the US export control system as it applies to commercial products reflects the realities of the post-Cold War era. This authority as much as possible should be contained in a single statute aimed at fundamental reform of the system.
- In order to reflect better the rapid pace of technological evolution, the review cycles for multilateral control lists should be shortened to reflect shorter product cycles. Mandatory reviews of control lists should be made every 18 months to two years. Items should be taken off the list unless the members of the multilateral control regime agree to leave them on.
- Business deserves to know precisely which countries and end users are the targets of control in order to maintain consensus about the legitimacy of controls.
- The National Economic Council (discussed below) should oversee export control policy in conjunction with the National Security Council (NSC) to ensure that export controls do not place an undue burden on US industries. Thorough cost-benefit analyses should be made, perhaps with the aid of impact assessments prepared by the US International Trade Commission's Office of International Competitiveness.

7. Other Domestic Export Disincentives

While the export control regime and inadequate export financing are obvious export disincentives, the Subcouncil believes other potential export disincentives should be reviewed. In particular, tax policy, product liability law, and antitrust laws need to be examined to ensure that they do not hobble the ability of US industry to compete in today's global market.

Tax Policy

The Subcouncil recommends that tax policy be reviewed to determine what measures need to be taken to remove current export disincentives and/or create incentives. Many members of the Subcouncil expressed support for moving toward a value added tax (VAT) — in contrast to our current tax regime — not only for macroeconomic purposes, but also to remove possible export disincentives built into the current tax system.[36] A VAT has the advantage of tilting incentives toward savings rather than consumption. Subcouncil members noted that the United States alone among major industrial nations does not have a VAT.

Product Liability[37]

Although product liability law is necessary and helpful to US consumers, the current application of the law in the United States places some US industries at a disadvantage to their foreign competitors. For many US industries — including chemicals, pharmaceuticals, machine tools, aircrafts, and other sophisticated products — changes in the interpretation and implementation of US product liability law over the past 30 years have made compensatory and punitive damages for torts an increasingly large business cost. Often substantial sums of money are spent even before the first unit is produced to procure insurance, to retain legal counsel, and to perfect designs that are as safe as possible. This puts American firms at a disadvantage because unless foreign competitors have extensive exposure in the United States they do not incur these costs.

US liability law favors plaintiffs much more so than that of any other country, making it easier to sue and receive high awards and settlements. Estimates of the extra costs facing American firms run as high as 2 percent of national output. This creates a substantial export disincentive for some US industries, and warrants a review of current application of product liability law.

Antitrust Laws

The antitrust laws must also be brought in line with the market realities of the 1990s. Currently, some elements of antitrust laws create disincentives for US competitiveness generally, and US exports specifically. A major deficiency in current antitrust laws is that in their implementation the Department of Justice is not adequately taking into account global market shares in its mergers and acquisitions determinations. Statutory provisions, based on the Sherman Act, lock regulators into focusing primarily on domestic consumer welfare rather than producer's global competitiveness in determinations of market concentration in antitrust cases. Other issues that may pose problems include the overlapping jurisdiction of the Department of Justice and the Federal Trade Commission, the time-consuming system of review of mergers and acquisitions, and policy discontinuity and different interpretations of the law by individual regulators in different Presidential Administrations which lead to confusion and uncertainty in the business community.

Recommendations

▶ *Create a New Competitiveness Policy Council Subcouncil on Antitrust Issues* — Given the complexity of antitrust and competition policy issues, a separate subcouncil on these issues should be established next year. In addition to antitrust specialists, the new subcouncil should include consumer advocates, business and labor representatives, and trade specialists in order to ensure that a review of antitrust laws is conducted in the context of their impact on the overall competitiveness of the United States. The Subcouncil remanded the following topics to the new subcouncil:

- Examine whether the factors keeping the Department of Justice from sufficient emphasis on global market shares are internal, or whether current statutory provisions — e.g., the Sherman Act — hinder the development of such an approach. It should be determined whether a shift towards a more global approach can be accomplished without statutory reform, or whether the law locks regulators into focusing excessively on domestic consumer welfare and inadequately on the global competitiveness of US industries.
- The overlapping jurisdiction of the Federal Trade Commission (FTC) and the Department of Justice should be examined to determine whether two agencies are needed to review antitrust cases, and how to reduce the overlap between the two agencies to speed up mergers and acquisitions review.
- Examine possible trade-offs between protecting domestic consumer interests — which is the purpose of current antitrust laws — and global competitiveness of US producers.
- Determine the best strategy to achieve harmonization and/or convergence of competition policy in the major industrialized countries.

▶ *Call for Greater Consideration of Global Market Shares in Determinations of Market Concentration* — Pending a statutory reform, the Subcouncil urges the Department of Justice and the FTC to take into account the global market in determinations on mergers and acquisitions and to adopt measures that are needed to bring the application of antitrust law in line with the market realities of the 1990s. In particular, the importance of considering global market shares should be highlighted through guidelines instructing government regulators to adopt a more global approach to antitrust cases.

▶ *Speed Department of Justice/FTC decisions on mergers and acquisitions cases.*

8. Trade Laws

US trade laws are an important tool for opening foreign markets to US businesses, curbing unfair trade practices, and providing temporary relief to industries in distress. However, trade laws cannot be relied upon as the sole means of restoring the competitiveness of US industries. To the extent that issues such as the education and training of the US workforce, capital formation, and technological impetus are tackled, the productivity and industrial competitiveness of the United States will be enhanced and reliance on import relief laws for industries in competitive distress from fair or unfair trade will be reduced. While no statutory changes to the trade laws were recommended, the Subcouncil recommends policy changes that will focus the time, energy, and resources of US trade officials on enhancing US exports in this new era.

The US should maintain laws that allow it to take recourse against foreign competitors that do not follow agreed trade norms. The unfair trade statutes are intended to discourage and prevent foreign suppliers from using unfair pricing practices to the detriment of a US industry, and to discourage and prevent governments from unfairly subsidizing their industries injurious to US producers. These laws should be reserved for clear cases of unfair trade practices, and not merely as another means for protection.

Import relief can have harmful, if unintended, effects on the US economy, so in cases where the law permits, it should be designed to minimize these effects.[18] For example, although quotas are the most direct means of reducing the importation of a foreign product, the foreign suppliers have the benefit of the quota rents, which they can then reinvest in their own industry, further handicapping the US industry. Voluntary restraint agreements are especially problematic because they lack transparency, masking the cost of protection to industrial users and consumers in the United States. A balance is needed so that import relief defends US industries while not placing an undue burden on US consumers and the rest of the economy.

US trade laws should be administered to take into account the need for temporary import relief and the need to promote the competitiveness of the US economy as a whole. Import relief provisions must be recognized as an aspect of a comprehensive economic strategy rather than as an alternative to it. Relief should, to the extent possible, be pro-competitive and have limited counter-productive effects on the economy. In cases where import relief is mandated to offset unfair trade practices, the goverment and all parties should not lose sight of the relief's impact on the overall economy.

The use of trade laws presently focuses largely on protecting US industries in distress, thus directing government resources and attention away from competitiveness and exporting goals and instead towards import relief. The Subcouncil urges trade policy makers to place more attention on market opening measures and enhancing US competitiveness through expanding exports.

Recommendations

▶ *Maintain Current Trade Statutes* — The Subcouncil calls for no statutory changes to the current trade statutes, which should be administered according to the laws' original intention. Antidumping and countervailing duty statutes should be maintained and carefully administered to offset unfair trade practices.

▶ *Industry Adjustment Should Be Taken into Account when Designing Import Relief, Especially in Cases when* *there is no Evidence of Foreign Unfair Trade Practices* — The Subcouncil expresses a preference for import relief that is tied to industry commitments to adopt adjustment measures as a more pro-competitive approach to helping US industries in distress when the cause of that distress is not only foreign competition and therefore when import protection alone is an insufficient form of relief. In particular, the Subcouncil urges a clear statement of presidential leadership and willingness to implement relief under Section 201. Section 201 provides for import relief to US industries to adjust to fair competition from foreign companies, but calls on the President, in determining whether to provide import relief, to take into account both the probable effectiveness of import relief in promoting adjustment in the industry concerned, and the efforts being made by that industry to adjust to foreign competition.

▶ *Comprehensive Studies to Enhance the Competitiveness of US Industries* — An increased capacity is needed within the government to study industries in order to help respond more effectively to requests for assistance. The International Trade Commission or Department of Commerce should be instructed to evaluate the global competitiveness of US industries, develop baseline projections of key industries as proposed in the first annual report of the CPC, and to issue recommendations for government initiatives in addition to import relief — such as research and development support, and worker adjustment assistance — that will enhance the competitiveness of these industries. These industry visions will assist in the formulation of less distortive measures that are more sensitive to the needs of the entire economy. Moreover, if prepared in a consistent and anticipatory manner, these industry visions might lead to actions which reduce the need for future government assistance.

9. Foreign Investment

On the matter of foreign investment by US firms, the Subcouncil recognizes that the reasons for overseas investment go beyond a search for cheaper labor to include a desire for easier access to overseas markets and technology, to penetrate tariff walls and to avoid other export barriers (including our own export controls), and to obtain export financing sponsored by overseas banking facilities.

The Subcouncil welcomes foreign investment in the United States as long as it provides clear benefits to the US economy and does not lead to a loss in the nation's technological capability. In order to make America a magnet for high-technology investment, the United States must adopt a national strategy to ensure the competitiveness of the nation by adequately addressing the domestic challenges of the education and training of the US work force, capital formation, and technological impetus.

At the same time, the Subcouncil urges the United States to use its open markets as a lever to liberalize foreign investment rules in the home markets of foreign investors in the United States. The goal is to ensure that US investors have the same opportunities and benefits abroad as foreign investors have in the United States. Liberal foreign investment rules abroad benefit the United States by increasing the penetrability of US exports, and benefit the host country by reducing the inefficiencies of closed sanctuaries. Post-Uruguay Round negotiations should build upon discussions on investment rules in the Uruguay Round.

10. Trade Bureaucracy Organization and Staffing

Reorganization

As the US economy becomes increasingly enmeshed with the global economy, *there is a growing concern about the adequacy of current government organizational and staffing arrangements to meet the demands for leadership, focus, and effectiveness in international trade policy*. Criticisms of the present organizational structure center on the fragmented and duplicative mechanisms involved in developing and implementing international economic policy, and the failure of the present government structure to focus national and presidential attention on US competitiveness as a national priority.

The problem is two-fold. First, economic and trade objectives have traditionally been subordinated to national security goals. However, with the end of the Cold War, competitiveness has become an increasingly important American goal, and economic strength is now as essential to national security as military strength.

Second, despite major changes in the US position in the world economy over the last decade, no significant changes have been made to the US government's organization for administering trade and other foreign economic policies since the adoption of Reorganization Plan No. 3 of 1979. Under this plan, the USTR was assigned the responsibility for trade negotiations and trade policy formulation, while the Department of Commerce was assigned general operational responsibility for major nonagricultural international trade functions.

The current division of labor and overlapping jurisdiction between the Department of Commerce and the USTR is not conducive to the development and implementation of a pro-competitive trade policy. Bureaucratic friction defeats coordination of trade policy functions, including policy planning, negotiations, export promotion, licensing, and legal regulation. Redundancy and inefficient competing jurisdictions reduce transparency, making it difficult for outsiders to access the system and easier for insiders to exert undue political influence. Moreover, the inefficient and illogical division of analytical and policy-making functions wastes resources that could be used to make better policy.

Recommendations

▶ *Create a National Economic Council* — The first priority is to reorganize the White House. White House organization reflects the priorities of the President, and is responsible for establishing the policies and direction of the entire government. The Subcouncil applauds the creation of the National Economic Council (NEC) which will help the President address today's economic priorities. In effect, the new council should be a "countervailing institution" to the National Security Council (NSC) that ensures that economic security is recognized as of equal importance to military security in protecting US interests. Hopefully, the new National Economic Council will ensure the prominence of economic considerations by elevating the importance and influence of economic advisers before the President, enforcing coordination among the various agencies involved in economic policy, and ensuring the contribution of international trade and economic advisors to White House decision-making.

The NEC should have fully staffed subcouncils to deal with coordination of various issues such as trade policy, export promotion, training, and technology. A major task of the new council should be to develop a coordinated pro-competitive economic strategy that would direct the efforts of the entire federal government. Thus, among other things, the establishment of the NEC should be an important first step towards developing a comprehensive pro-competitive trade strategy that establishes priorities for export promotion.

The creation of a NEC alongside the existing National Security Council raises the need to coordinate the trade policy interests of both councils. (Both councils, for example, will wish to exercise some control over export control policy.) This coordination can be accomplished through the Chief of Staff or by appointing a staffer who reports to both the NSC Advisor and the NEC Advisor.

▶ *Revamp the Trade Bureaucracy* — While most recognize that the ultimate responsibility for rationalizing US economic policy lies with the President, the system by which policy is made and carried out needs constructive change that will make it simpler and more transparent. Measures must be taken to facilitate the coordination of a currently disjointed apparatus, reduce duplication and needless division, reduce vulnerability to political manipulation by various interest groups, and increase the stature of the cabinet official responsible for trade policy. The Subcouncil strongly believes that a more coordinated, efficient organizational structure needs to be developed in order to better serve US competitiveness goals.

Trade Negotiators

As the US economy becomes more intertwined with the global economy, the need for a professional cadre of career trade negotiators with experience and institutional memory is increasingly apparent. The US has been traditionally disadvantaged in its negotiations with its trading partners because of the high turnover of politically appointed negotiators. As a result, our trade negotiators lack the institutional history, negotiating experience, and familiarity with US trade policy that permits a strong, focused strategy vis a vis our overseas interlocutors. Conflicts of interest when former government officials exit the government and enter the private sector for monetary reasons is a related concern. In order to reduce the high turnover rate among trade negotiators, the incentives that lead government officials to leave government service to enter the private sector must be addressed.

Recommendations

▶ *Study the Feasibility of Creating a Professional Trade Negotiating Corps* — The Subcouncil recommends a study of the feasibility of a new professional trade negotiating corps as a constructive step to improving the staffing of the trade bureaucracy. Such a corps may accomplish the twin goals of strengthening the quality and institutional memory of our negotiating team, and of reducing staff turnover by removing incentives for trade officials to leave government.

▶ *Limit Politicization of Top Government Positions* — Along with a study of a professional trade negotiating corps, the Subcouncil recommends that the politicization of the trade bureaucracy in Washington be reduced. Politicization of posts reserved for trade experts spurs career civil servants to leave as they realize that their ambitions to rise to top jobs can never be achieved.

Notes

1. Stephen Cooney, *The New US Trade Agenda* (Washington, DC: National Association of Manufacturers, December 1992) p. 6.
2. Gary Teske, *US Trade on the Rebound: Contributing to US Growth and Employment*, US Department of Commerce, International Trade Administration, Staff Paper No. 91-4 (Washington, DC: US Government Printing Office, June 1991) p. 1.
3. Lester A. Davis, *US Jobs Supported by Merchandise Exports*, US Department of Commerce, Economics and Statistics Administration, Research Series OMA-1-92 (Washington, DC: US Government Printing Office, April 1992) p. iii.
4. US Census Bureau, *Exports From Manufacturing Establishments* (Washington, DC: US Government Printing Office, 1993).
5. Teske, *op. cit.*, p. 1.
6. United States Trade Representative, "US Exports Create High-Wage Employment." Press release, June 1992.
7. The USTR study found that the wage difference is greatest in the service sector, where export-related jobs earn almost 20 percent more than the national average. While manufacturing workers still earn more than service workers, it is striking that export-related jobs in the service sector earn more on average than manufacturing jobs overall in the US economy.
8. Lawrence F. Katz and Lawrence H. Summers, "Can Interindustry Wage Differentials Justify Strategic Trade Policy?," *Trade Policies for International Competitiveness*, ed. Robert C. Feenstra (Chicago: University of Chicago Press, 1989) p. 109.
9. Cooney, *op. cit.*
10. *Ibid.*, p. 15.
11. J. David Richardson, *Sizing Up Export Disincentives* (Washington, DC: Institute for International Economics, forthcoming, draft from November 12, 1992) p. 5.
12. Allen Lenz describes finished products as products used by consumers and producers, roughly accounted for by combining machinery and transport equipment (SITC 7) and miscellaneous manufactures (SITC 8). Intermediate goods or industrial supplies are inputs that will be further processed into other products, and are roughly accounted for by combining chemicals (SITC 5) and basic manufactures (SITC 6). While these are imperfect categories, they provide a rough indication of the production technology characteristics of the two groups. From Allen J. Lenz, *Narrowing the US Current Account Deficit: A Sectoral Assessment* (Washington, DC: Institute for International Economics, 1992) p. 84.
13. Lenz, *op. cit.*, p. 87.
14. Susan Hickok, "The Shifting Composition of US Manufactured Goods Trade," *Federal Reserve Bank Of New York Quarterly Review*, Spring 1991, p. 27.
15. Ilyse Zable, *Trade Profile*. Study commissioned by the Trade Policy Subcouncil. 1993.
16. Richardson, *op. cit.*, p. 4.
17. *Ibid.*, p. 5.
18. The ratio for exports of goods and services, as noted above, is higher.
19. Teske, *op. cit.*, p. 2.
20. US Department of Commerce, *Strategic and Technical Reviews Working Paper: Export Assistance Needs* (Washington, DC: US Government Printing Office, March 1990).
21. Richardson, *op. cit.*, p. 5.
22. C. Fred Bergsten, director of the Institute for International Economics, estimates that the Japanese yen is undervalued by 20 to 25 percent. See: C. Fred Bersten, "America's Trade Performance and Outlook," Statement before the Subcommittee on Trade, Committee on Ways and Means (Washington, DC: US Government Printing Office, March 23, 1992).
23. Paul R. Krugman, "Has the Adjustment Process Worked?", *International Economics* 34 (October 1991).
24. Paula Stern and Paul A. London, "Deficits in Trade and Leadership," *The Washington Quarterly*, Autumn 1990.
25. Thomas O. Bayard and Kimberly A. Elliott. "'Aggressive Unilateralism' and Section 301: Market Opening or Market Closing?," Presented at NBER Conference on The Political Economy of Market Access Negotiations, August 4, 1992 revision, p. 28.
26. General Accounting Office. *The US Export-Import Bank: The Bank Plays an Important Role in Promoting Exports* (Washington, DC: US Government Printing Office, May 6, 1992) p. 4.
27. International Business-Government Counsellors, Inc. "A Comparison of US and Foreign Country Export Counselling and Financing Programs," March 25, 1992. Based on IMF figures.
28. Richardson, *op. cit.*
29. Thomas J. Mullany, Testimony on behalf of the Coalition for Employment through Exports before the Sucommittee on International Finance and Monetary Policy, Committee on Banking, Housing, and Urban Affairs, May 14, 1992.
30. Bundling refers to a transaction in which the Eximbank guarantees a medium-term loan from a US bank to a bank in an importing country. The loan is disbursed in small packages to importers of US goods, and when a certain amount has been disbursed, the loans are "bundled"

into promissory notes and one large security issue is floated in the capital markets. By combining a number of small export loans into a single large loan, small exporters find it much easier to tap into financing.

31. US General Accounting Office, *The US Export-Import Bank: The Bank Plays an Important Role in Promoting Exports* (Washington, DC: US Government Printing Office, 1992).

32. US General Accounting Office, *Export Promotion: A Comparison of Programs in Five Industrialized Nations* (Washington, DC: US Government Printing Office, June 1992) p. 4.

33. Trade Promotion Coordinating Committee, *Exporting Programs: A Business Directory of US Government Resources* (Washington, DC: US Government Printing Office, May 1992).

34. National Association of Manufacturers, "Export Control Questionnaire," Report to Members, July 17, 1992.

35. Unilateral controls may at rare times be a useful tool to demonstrate US leadership when multilateral cooperation is not initially forthcoming in achieving foreign policy goals.

36. Macroeconomic effects of a VAT, especially its stimulus to household and business savings, can be expected to improve the current account balance of exports over imports.

37. The information in this section is from Richardson, *op. cit.*

38. Numerous studies have been conducted analyzing the effect of import relief on US industries and the economy as a whole. See, for example, Gary Hufbauer and Howard Rosen, *Trade Policy for Troubled Industry* (Washington, DC: Institute for International Economics, 1986). Hufbauer and Rosen reported that protection from imports cost US consumers $56 billion in 1986. A more recent example of the unintended effects of import relief was the flat panel display dumping case of 1991. Antidumping duties were imposed over the strenuous objections of US computer companies — the customers of flat panel display manufacturers — many of which have relocated facilities offshore to avoid the dumping duty. See "Constructing a New US Trade Policy," remarks of Allan Wm. Wolff at the Economic Strategy Institute, October 5, 1992.

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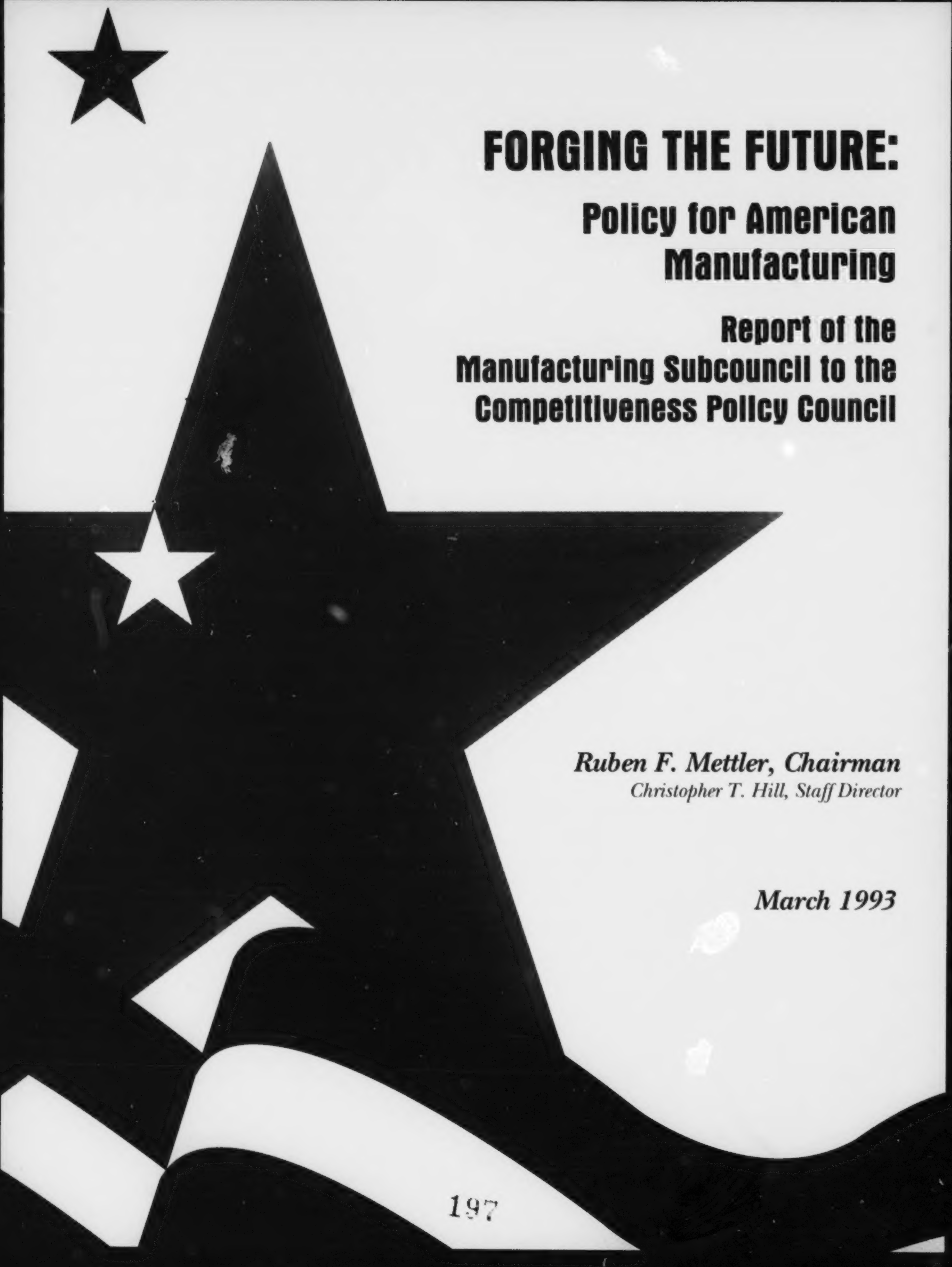

FORGING THE FUTURE:

Policy for American Manufacturing

Report of the Manufacturing Subcouncil to the Competitiveness Policy Council

Ruben F. Mettler, Chairman

Christopher T. Hill, Staff Director

March 1993

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Competitiveness Policy Council
Washington, D.C.

C. Fred Bergsten
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Washington, DC 20036

Dear Fred:

In April 1992 the Competitiveness Policy Council established a number of subcouncils to prepare detailed recommendations on specific areas of public policy. The Manufacturing Subcouncil, along with its seven sister subcouncils, has worked since that time to analyze the conditions of, and trends in the competitiveness of, US industries, especially manufacturing. It has also examined the impact of public policy on US manufacturing and has discussed at length the desirability of changes in public policies that could provide a more supportive climate for manufacturing in the future.

The Manufacturing Subcouncil held four meetings in June, September, and October 1992. The Subcouncil also sponsored a one-day workshop in Irvine, California, on "Removing Barriers to Effective Defense-Commercial Industrial Transition." A report of this workshop is available from the Competitiveness Policy Council.

The Subcouncil wishes to thank the many speakers who gave of their time and wisdom in the course of those meetings. We also wish to thank the numerous individuals and organizations who assisted us with information, analyses, and advice during our deliberations.

The Manufacturing Subcouncil has been administered at the National Academy of Engineering through a contract between the Competitiveness Policy Council and the National Academy of Sciences, acting for the National Academy of Engineering. The views expressed in this report are those of the Manufacturing Subcouncil and are not those of the National Academy of Engineering or the National Academy of Sciences.

The Manufacturing Subcouncil also thanks Penelope J. Gibbs, administrative assistant, and Theodore W. Jones, research associate, of the National Academy of Engineering for their many contributions to our work.

Sincerely,

Ruben F. Mettler

Ruben F. Mettler
Chairman, Manufacturing Subcouncil

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I. Introduction

Manufacturing industries are the lifeblood of a modern, high-income, competitive economy. An examination of the performance of US manufacturing industries and of their response to the competitiveness challenge facing America is a central element in the more general inquiry into our nation's economic future.

As part of its work plan for its second year, the Competitiveness Policy Council established eight subcouncils, one of which is the Manufacturing Subcouncil. According to the Council's first annual report:

> "... the Council is establishing a set of Subcouncils to assist us in crafting solutions to a number of the major competitiveness problems facing America. The Subcouncils will seek to develop goals for America in each area and offer specific recommendations to deal with the problems they are addressing."

The eight Subcouncils, which cover a wide range of issues in the competitiveness debate, are:

- Capital Formation
- Corporate Governance and Financial Markets
- Critical Technologies
- Education
- Manufacturing
- Public Infrastructure
- Trade Policy
- Training

The general charge to the subcouncils was interpreted by the Manufacturing Subcouncil for its first meeting:

> "The task of the Subcouncil on Manufacturing is to develop specific recommendations for actions that will help ensure that the United States maintains (and rebuilds where necessary) a world-class manufacturing industry to support vigorous economic growth and competitiveness."

To carry out this task, the Manufacturing Subcouncil considered six broad agenda topics:

- Enhancing Investment in Manufacturing Assets
- Education and Training for Manufacturing Excellence
- Accelerating Application of Best Manufacturing Practices to Mutually Supportive Defense and Commercial Manufacturing
- Manufacturing as a Critical Technology
- Developing Leadership and Strategic Direction for World-Class Manufacturing Competitiveness.

These six agenda topics, while broad, do not cover all of the salient issues in improving manufacturing performance and competitiveness. The other seven subcouncils are responsible for aspects of these issues, and their domains overlap to a considerable extent with those of the Manufacturing Subcouncil. The full CPC will draw from and integrate the work of the various subcouncils in formulating its own recommendations to the Congress and the administration.

For each of its agenda topics, the Subcouncil examined a variety of studies and reports, engaged in discussions with experts, and drew upon its members' experiences and insights to develop a series of findings and a set of public policy recommendations to address them.

This report begins with an overview in Chapter II of the Subcouncil's findings on the nature of the present challenge to manufacturing industries in the United

States, including a review of the performance of manufacturing in historical and international context.

We then offer in Chapter III a set of goals for the future of US manufacturing industries. These goals are motivated by a comparison with other successful industrial nations, by our own past performance, and by a sense of what would be reasonable undertakings for America. The goals should be thought of as indicative, rather than strictly prescriptive. Nevertheless, they put the needs of manufacturing in sharp relief.

The heart of this report is the recommendations of the Subcouncil in Chapter IV. They address the needs and opportunities inherent in manufacturing industries across a broad public policy front. The Subcouncil wishes to emphasize that not all of its members necessarily subscribe to all of its recommendations. The agreement on general direction and on most recommendations was widespread. However, in the end members have adopted this report as a whole, and individual differences with its findings and recommendations can be expected.

The recommendations must be considered as an integrated system of concerns. The performance of modern manufacturing industries depends on effectively addressing each of the concerns in the context of the others. There are no "magic bullets" to help reshape American manufacturing. Training manufacturing workers to use new skills and to assume a new level of responsibility will benefit them and their employers little unless management invests in the new technologies that can effectively employ their skills, invests in the plant and equipment that can put them to work, and makes the changes in the control of the workplace that can enable workers to take greater responsibility for the quality and character of their work. Similarly, growth in manufacturing production in the United States can only be achieved if new product and process technologies are employed to create the high-value-added goods that can gain a greater share of world markets. And, the new technology can only be deployed successfully if workers are given the skills necessary to use it effectively.

Therefore, no one of these recommendations is likely to be sufficient to meet all the needs of manufacturing; since manufacturing is a complex system that is affected by every aspect of our economic and political culture, a coherent set of actions is needed to restore American manufacturing to its position of preeminence in the world.

We recommend one such set below.

II. Findings Regarding the Challenge to US Manufacturing

Manufacturing and American Well-Being

Ensuring economic growth and building a prosperous, globally competitive society are the dominant economic challenges to the United States into the next century. Maintaining US national security and mounting an effective foreign policy are closely linked to a strong domestic economy. A world-class manufacturing sector in the United States is essential to sustaining a strong economy and to our national security, both directly and indirectly.

▶ Manufacturing — the conversion of matter and energy by organized groups of people and machines into useful goods at a fixed location — is an ancient, yet quintessentially modern aspect of our world.

▶ A growing and successful manufacturing sector creates a continuing flow of new, high-quality jobs that is essential to the well-being and high standard of living of the American people.

▶ Manufacturing is inextricably linked by webs of interdependence to other key sectors of the economy, including high-wage services industries.

▶ New communications and transportation technologies and the rise of a large number of competent industrial nations around the world have combined to expose essentially all US manufacturing industries to a new, more challenging level of global competition, not only on the basis of low price, but also increasingly on the bases of high quality, timeliness, and consumer value.

The Evolving Nature of Manufacturing Systems

During the past two decades, manufacturing industries at home and abroad have undergone a revolution in strategy; organization; administrative control; relationships with suppliers, employees, and customers; technology; product development strategies; and relationships with competitors and the larger community.

▶ Much more than in past decades, world class manufacturing requires the successful management of complex production systems that are open to the flow of information, ideas, and people through diverse networks of interaction.

▶ The elements of an integrated manufacturing production system include (the Subcouncil emphasized those in italics during its deliberations):

- Management and Strategy
- Customer Needs and Product Planning
- *Product and Process Engineering Applied Science, Technology, Materials*
- *Trained, Empowered and Committed Workforce*
- *Factory Operations*
    - Organization and Working Relationships
    - Plant and Equipment
    - Finance and Accounting
    - *Education and Training*
- *Suppliers and Vendors*
- Marketing, Sales, Distribution, Service

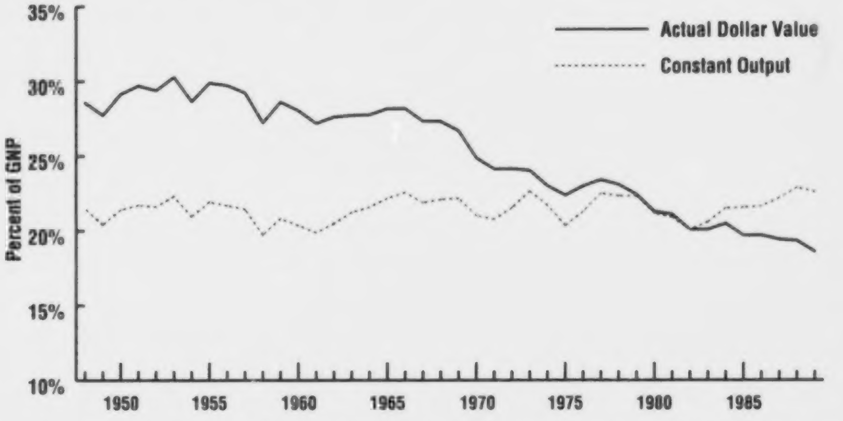
▶ Public actions to support world-class manufacturing must treat all aspects of the integrated production system. Addressing only one part of the substantive policy agenda without the others is unlikely to prove effective.

Why Manufacturing Matters

Manufacturing industries play key roles in a ensuring that the economy remains strong and that the nation remains secure. In recent decades, it has become fashionable to proclaim that we are entering a post-industrial world in which manufacturing will be supplanted by the exchange of a vast array of services. Clearly, a cornucopia of services is at hand. It is equally clear, however, that all sectors of the economy depend on each other for inputs, for markets, and for ideas. Manufacturing "matters" very much.[1] The structural shift implied by the post-industrial concept reflects in substantial measure changes in the organization of productive enterprises. For example, through the outsourcing of administrative support, engineering, legal, and financial activities, manufacturing companies have reduced their numbers of employees and their contributions to national value added, while contributing to the growth of the service sector.

Figure 1

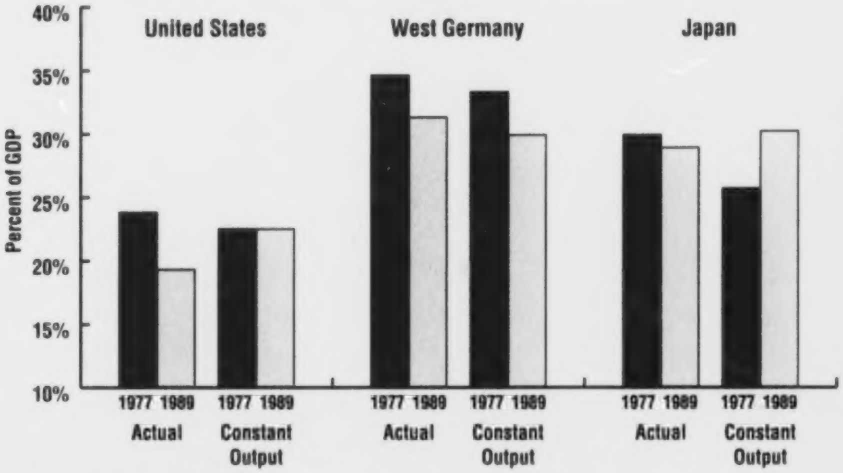
Manufacturing's Share of Gross National Product



SOURCE: MBG The Business Information Company, Washington & US Dept. of Commerce, Bureau of Economic Analysis

Figure 2

International Comparison of Manufacturing's Share of GDP

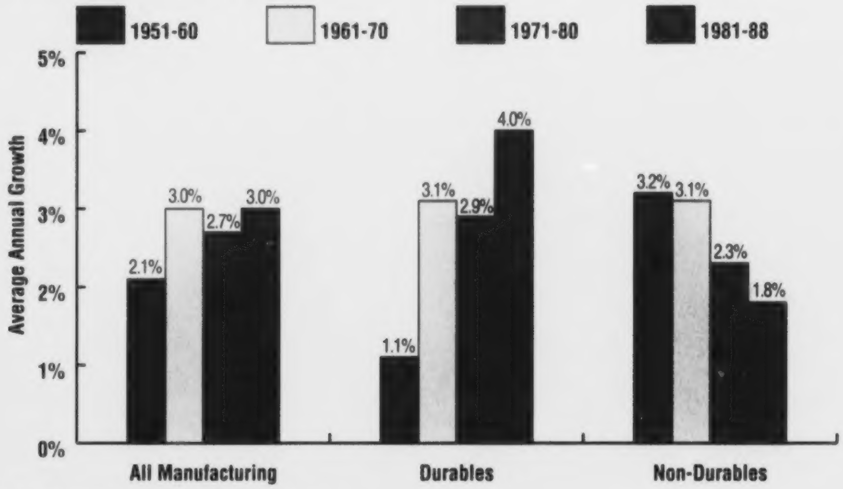


SOURCE: MBG - Washington & OECD National Accounts

- Manufacturing produces nearly one-fifth of the gross domestic product (GDP) of the United States, and it employs nearly one-sixth of the Americans who work in the private, nonfarm economy.
- Manufacturing jobs have traditionally provided entré to the middle class for skilled and unskilled residents as well as for new immigrants.
- US production of globally competitive manufactured products plays a major role in maintaining the nation's trade balance at acceptable levels.
- Manufacturing industries are the major customers for a significant portion of America's legal, accounting, financial, real estate, engineering, advertising, medical, security and other services.[2]
- Manufactured products are the lifeblood of the service sector — fast food, legal services, shopping centers, electronic media, and the like would be impossible without them.
- Without the constant exchange of needs and ideas among manufactur-

Figure 3

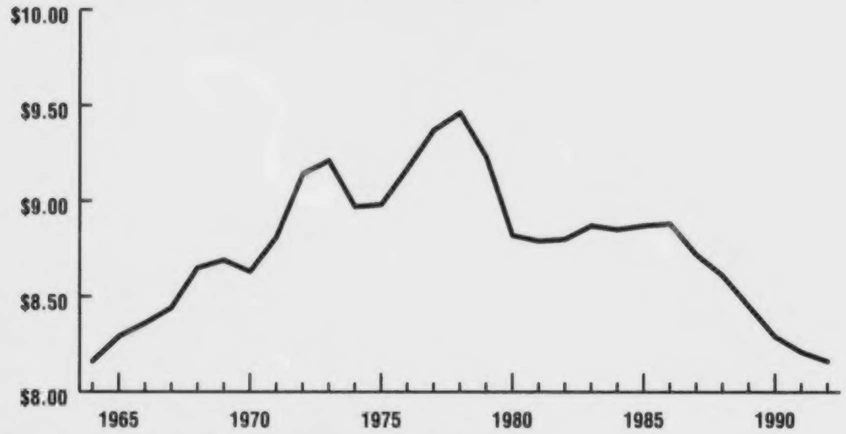
Growth of Constant Output per Hour



SOURCE: MBG - Washington & US Dept. of Labor

Figure 4a

Hourly Wages for Manufacturing (1982-84 dollars)



SOURCE: US Bureau of Labor Statistics, Employment and Earnings, various issues

ing and high-value-added service industries that typifies the American scene, it is unlikely that key US service industries could remain world class, as their competitors would get earlier and more effective access to new manufactured products that often underlie new services.

▶ America's lead in technology depends on the 70 percent of all national R&D and the 90 percent of all private industrial R&D carried out by manufacturing companies.[3]

▶ US national security depends directly on the availability of a wide range of manufactured defense products, from clothing and ammunition to complex weapons and communications systems.

▶ While some degree of interdependence with allies is healthy, a strong domestic defense manufacturing base is directly essential to our security.

▶ Indirectly, US national security is underwritten by the wealth generated by our manufacturing industries — without this manufacturing-generated wealth the United States would be much less effective at defending itself and projecting its influence around the world.

Trends in US Manufacturing Performance[4]

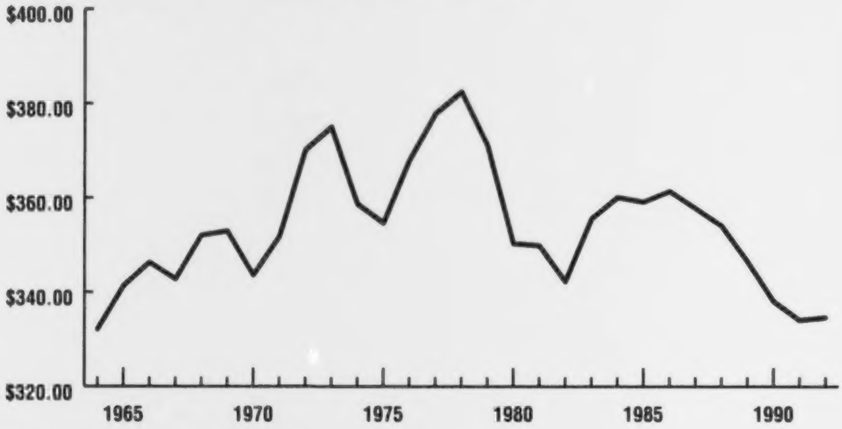
After many years of being the unchallenged world leader in many, if not most, aspects of manufacturing, present trends in the performance of American manufacturing paint at best a mixed picture, and trends in some of the tangible and intangible investments that underlie improvements in manufacturing's performance do not bode well for the future.[5] Furthermore, in the international context, US manufacturing lags key competitor nations in a number of important respects.

Manufacturing and National Output

▶ Manufacturing's share of gross national product in current dollar

Figure 4b

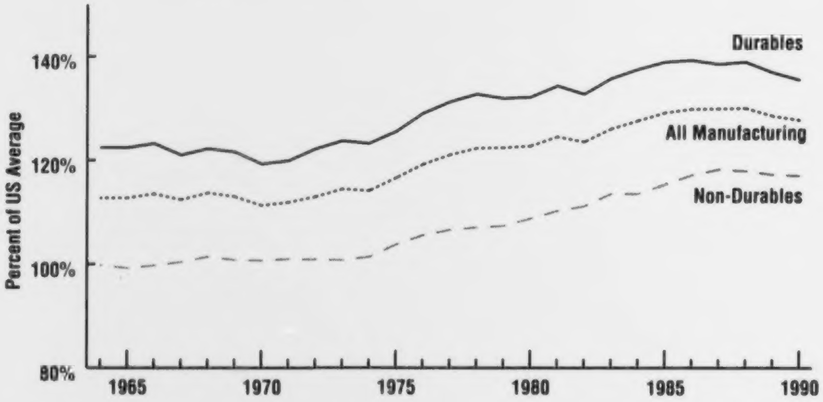
Weekly Wages for Manufacturing (1982-84 dollars)



SOURCE: US Bureau of Labor Statistics, Employment and Earnings, various issues

Figure 5

Average Weekly Wages and Salaries



SOURCE: MBG - Washington & Bureau of Labor Statistics

terms has declined steadily since it reached a peak of just over 30 percent in 1953 (see the solid line on Figure 1). By 1989, it had fallen to a low of 18.6 percent.

▶ When measured in inflation-adjusted, or "real" terms, manufacturing's share of gross national product (GNP) has remained remarkably constant over the past several decades at between 20 and 22.5 percent.[6] (see the shaded line on Figure 1). However, this says less about the persistence of manufacturing than it does about the poor relative productivity performance of other major sectors of the economy, for which prices increased more rapidly and quality increased less rapidly than for manufacturing.

▶ The downward trend in manufacturing's share of current-dollar GNP, by itself, is not necessarily cause for alarm. Larger historical declines have occurred in agriculture and mining, without undesirable consequences for the economy as a whole, even though they have been accompanied by often-severe dislocations for individual workers, firms, and communities.

▶ The upward trend in manufacturing's share of "real-dollar" GNP during the 1980s similarly is not necessarily cause for complacency regarding manufacturing's future.

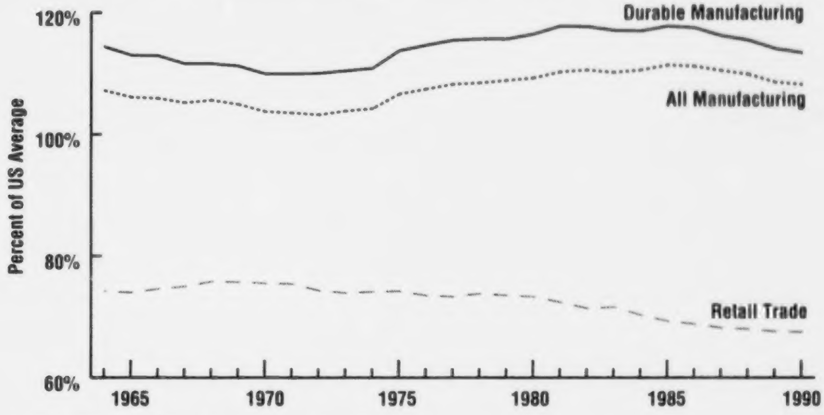
▶ Manufacturing is half again as important to the national economies of Germany and Japan as to the United States (see Figure 2). In 1989, manufacturing accounted for 19.3 percent of current-dollar GDP in the United States, whereas it accounted for 31.1 percent in Germany, and 28.9 percent in Japan.[7] Similar differences are evident in Figure 2 for "real" GDP. The differences have persisted for a number of years.

Manufacturing Productivity, Wages and Jobs

Compared with most industrial nations, US manufacturers pay higher prices for labor, capital, employer-paid employee benefits, compliance with government regulations, and other factors of

Figure 6

Hourly Earnings of Manufacturing Production Workers



SOURCE: MBG - Washington & Bureau of Labor Statistics

production. To a considerable extent, these higher costs reflect the higher standard of living of the American people and their expectations of a high quality of life. Thus, while these costs, which tend to put US manufacturers at an overall cost disadvantage compared with competitors, should be controlled to the extent possible, nevertheless if we are to retain our higher standards, ways must be found to manufacture higher-value-added products using smaller amounts of expensive inputs. In other words, the key to long-run American prosperity continues to be ensuring that our manufacturing productivity remains high. This, in turn, requires a continuing high rate of labor productivity growth. At the same time, manufacturing output should grow, and US producers' share of the world market for manufactured goods must remain high to ensure that the labor released from existing production as productivity grows can be employed in new, high-wage jobs in the future.

▶ Labor productivity in manufacturing has grown at between 2.7 and 3.0 percent annually, on average, for the last three decades (see Figure 3).

▶ Historically, the increasing productivity of manufacturing enabled workers to earn rising real wages, which, in turn, made it possible for them to enjoy an increasing standard of living. However, average real wages of manufacturing workers peaked in 1978 and have dropped sharply since then (see Figure 4).

▶ Manufacturing workers have enjoyed wages higher than those of the typical US worker for many years, reaching nearly 30 percent higher than average on a weekly basis in 1990 (see Figure 5) and about 10 percent higher on an hourly basis (see Figure 6).

▶ Because labor productivity in manufacturing has been rising more rapidly than manufacturing output, especially since the early 1970s, the total number of US jobs in manufacturing has been in decline since the late 1960s (see Figure 7). The persistent economic slow-down of the early 1990s has exacerbated the job loss. Furthermore, the proportion of all nonfarm jobs that are in manufacturing has dropped from more than 30 percent in the early 1960s to less than 17 percent in 1992 (see Figure 8).

▶ The decline in manufacturing employment is limiting the opportunities of many Americans without advanced education to qualify for the kinds of jobs that pay the higher-than-average wages typical of manufacturing industries. Furthermore, the proportion of manufacturing employment consisting of production and nonsupervisory workers is in decline, despite the outsourcing of increasing proportions of administrative and specialized functions, which further limits entry level employment in manufacturing (see Figure 9).

▶ In 1989, 19.5 million Americans were employed in 363,200 manufacturing establishments (a firm may include numerous physically distinct establishments). Twenty-eight percent of the employees were employed by establishments with

Figure 7

US Nonfarm Payroll Employment (Thousands)

Nonfarm		Manufacturing			Share of Nonfarm Total		
Year	Total	Total	Durables	Nondurables	Manuf.	Durables	Nondurables
1961	53,999	16,326	9,041	7,285	30.23%	16.74%	13.49%
1962	55,549	16,853	9,450	7,403	30.34%	17.01%	13.33%
1963	56,653	16,995	9,586	7,410	30.00%	16.92%	13.08%
1964	58,283	17,274	9,785	7,489	29.64%	16.79%	12.85%
1965	60,765	18,062	10,374	7,688	29.72%	17.07%	12.65%
1966	63,901	19,214	11,250	7,963	30.07%	17.61%	12.46%
1967	65,803	19,447	11,408	8,039	29.55%	17.34%	12.22%
1968	67,897	19,781	11,594	8,187	29.13%	17.08%	12.06%
1969	70,384	20,167	11,862	8,304	28.65%	16.85%	11.80%
1970	70,880	19,367	11,176	8,190	27.32%	15.77%	11.55%
1971	71,214	18,623	10,604	8,019	26.15%	14.89%	11.26%
1972	73,675	19,151	11,022	8,129	25.99%	14.96%	11.03%
1973	76,790	20,154	11,863	8,291	26.25%	15.45%	10.80%
1974	78,265	20,077	11,897	8,181	25.65%	15.20%	10.45%
1975	76,945	18,323	10,662	7,661	23.81%	13.86%	9.96%
1976	79,382	18,997	11,051	7,946	23.93%	13.92%	10.01%
1977	82,471	19,682	11,570	8,112	23.87%	14.03%	9.84%
1978	86,697	20,505	12,245	8,259	23.65%	14.12%	9.53%
1979	89,823	21,040	12,730	8,310	23.42%	14.17%	9.25%
1980	90,406	20,285	12,159	8,127	22.44%	13.45%	8.99%
1981	91,156	20,170	12,082	8,089	22.13%	13.25%	8.87%
1982	89,566	18,781	11,014	7,767	20.97%	12.30%	8.67%
1983	90,200	18,434	10,707	7,726	20.44%	11.87%	8.57%
1984	94,496	19,378	11,479	7,899	20.51%	12.15%	8.36%
1985	97,519	19,260	11,464	7,796	19.75%	11.76%	7.99%
1986	99,525	18,965	11,203	7,761	19.06%	11.26%	7.80%
1987	102,200	19,024	11,167	7,858	18.61%	10.93%	7.69%
1988	105,536	19,350	11,381	7,969	18.33%	10.78%	7.55%
1989	108,329	19,442	11,420	8,022	17.95%	10.54%	7.41%
1990	109,782	19,117	11,130	7,988	17.41%	10.14%	7.28%
1991	108,310	18,455	10,602	7,852	17.04%	9.79%	7.25%
1992	108,517	18,150	10,304	7,846	16.73%	9.50%	7.23%

SOURCE: MBG-Washington & US Bureau of Labor Statistics. 1992 data are seasonally adjusted for August.

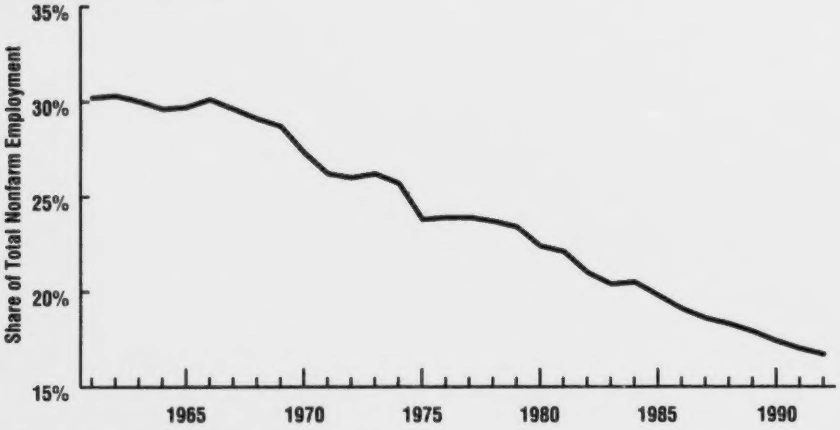
fewer than 100 employees, 37 percent by establishments employing fewer than 500 employees, and 24 percent by establishments employing more than 1,000 persons.[8]

▶ While the number of manufacturing jobs has been declining in the United States, as well as in Germany, it has actually risen in Japan over the past decade (see Figure 10).

▶ Between 1979 and 1991, manufacturing labor productivity grew at an annual average rate of 2.4 percent in the United States, compared with 4.3 percent in Japan, 1.9 percent in Germany (FRG only), 4.3 percent in the U.K., and 3.1 percent in France.[9]

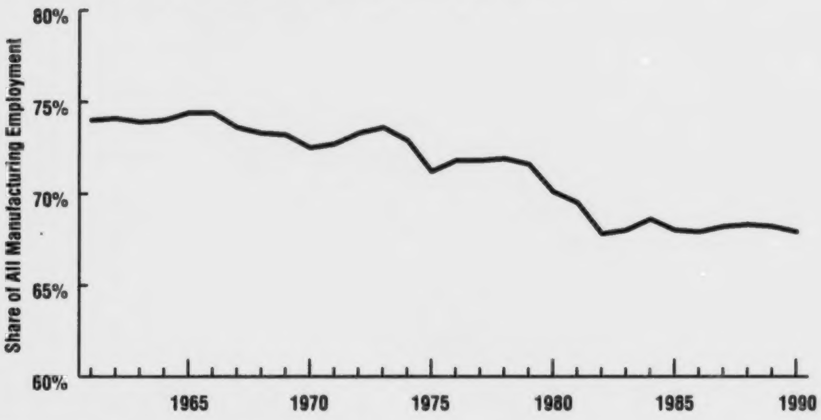
▶ International comparisons of labor productivity *levels* are difficult and controversial, because they require comparison of outputs measured in different countries' currencies. (For technical reasons, comparing labor hours of input is also difficult.) For the leading industrial countries, productivity levels are now close enough that different currency

Figure 8
US Manufacturing Jobs



SOURCE: MBG - Washington & Bureau of Labor Statistics

Figure 9
Production & Non-Supervisory Manufacturing Workers



SOURCE: MBG - Washington & Bureau of Labor Statistics

conversion methods yield conflicting results regarding which countries have higher manufacturing labor productivity.[10]

US Manufacturing in World Markets

Following World War II, US manufacturers dominated world trade in a wide variety of manufactured goods. Since the early 1980s, however, US manufacturers have run a net trade deficit and their share of world trade in high-technology manufactured goods has slipped as well.[11] Furthermore, goods manufactured in other countries have accounted for a slowly growing share of the consumption of manufactured goods in the United States. These trends do not hold for all industries, and some industries have experienced a considerable revival of their international position. In addition, the net position of US manufacturing is due in substantial measure to macroeconomic forces largely beyond its control, including the budget deficit and monetary policies at home and abroad. Nevertheless, patterns of international trade are important in understanding the competitiveness of US manufacturers.

▶ The United States has run a net deficit in international trade of manufactured products in every year since 1983 (see Figure 11). This deficit peaked in 1987 and has been coming down steadily since then (except for a rise again in 1992) as the dollar has weakened against other currencies.

▶ The manufactures trade deficit is highly focused on Japan. In 1991, when the overall US balance of trade in manufactured goods ran a deficit of $47.7 billion, the manufacturing deficit with Japan alone was $59.6 billion; i.e., excluding Japan, the United States experienced a net positive trade balance in manufactured goods of $11.9 billion.

▶ The favorable position of US industries in world trade is highly concentrated. Airplanes enjoyed a

$20.7 billion surplus in 1991; the next largest surpluses were $6.7 billion in scientific instruments, $6.5 billion in chemicals-plastics, and $6.2 billion in airplane parts (see Figure 12).

▶ Unfavorable trade balances are similarly concentrated in a few industries — clothing, motor vehicles, telecommunications equipment, and footwear (see Figure 12).

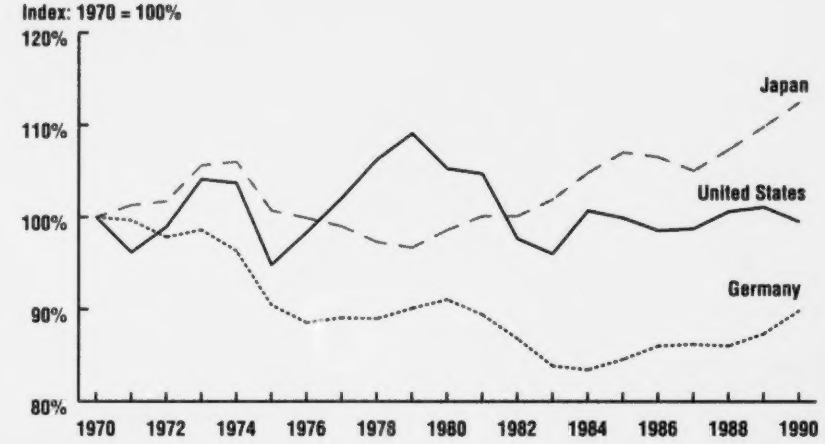
▶ US imports from Japan are highly concentrated in four industry groups: motor vehicles, electric machinery, nonelectric machinery, and instruments account for over 80 percent (see Figure 13). US exports to Japan are much more diverse, with only 33 percent accounted for by the top four — machinery, electric machinery, air and space craft, and wood and charcoal. Natural resource based products are a substantial portion of US exports to Japan.

▶ According to expert opinions of leading scientists and engineers, the United States lags Japan and Europe in its abilities to develop and produce a number of advanced technologies of industrial importance, and the trends in a number of cases are toward an even less advantageous position for the United States (see Figure 14).

▶ In 1991, the top three, and five of the top ten, recipients of US patents were Japanese firms. The other five were US firms.[12]

Figure 10

International Comparison of Jobs in Manufacturing



SOURCE: MBG - Washington & Bureau of Labor Statistics

Figure 11

US Manufacturing Trade Imbalance

	(Millions of US Dollars)			Export Growth	Import Growth
Year	Exports	Imports	Balance		
1970	$31,720.1	$27,332.0	$4,388.1	N/A	N/A
1971	$32,904.6	$32,103.7	$800.9	3.73%	17.46%
1972	$36,503.2	$39,710.0	($3,206.8)	10.94%	23.69%
1973	$48,467.7	$47,130.6	$1,337.1	32.78%	18.69%
1974	$68,512.6	$57,829.7	$10,682.9	41.36%	22.70%
1975	$76,869.5	$54,004.0	$22,865.5	12.20%	-6.62%
1976	$83,120.2	$67,631.8	$15,488.4	8.13%	25.23%
1977	$88,901.7	$80,504.0	$8,397.7	6.96%	19.03%
1978	$103,633.8	$104,334.4	($700.6)	16.57%	29.60%
1979	$132,745.4	$117,130.9	$15,614.5	28.09%	12.26%
1980	$160,651.4	$132,986.5	$27,664.9	21.02%	13.54%
1981	$171,749.3	$149,752.1	$21,997.2	6.91%	12.61%
1982	$155,305.4	$151,727.9	$3,577.5	-9.57%	1.32%
1983	$148,664.7	$170,865.2	($22,200.5)	-4.28%	12.61%
1984	$164,071.3	$230,909.6	($66,838.3)	10.36%	35.14%
1985	$168,025.0	$257,477.6	($89,452.6)	2.41%	11.51%
1986	$179,818.6	$296,652.7	($116,834.1)	7.02%	15.21%
1987	$199,883.5	$324,443.9	($124,560.4)	11.16%	9.37%
1988	$255,638.7	$361,381.0	($105,742.3)	27.89%	11.38%
1989	$287,017.5	$379,425.4	($92,407.9)	12.27%	4.99%
1990	$315,747.3	$388,806.2	($73,058.9)	10.01%	2.47%
1991	$345,377.0	$393,070.0	($47,693.0)	9.38%	1.10%

SOURCE: MBG - Washington & the US Department of Commerce, ITA

Trends in Investment in Tangible and Intangible Manufacturing Assets

Investments in tangible and intangible manufacturing assets in the United States have trailed those of important competitor nations, as well as domestic historical trends, for the past two decades. To a certain extent, the low level of investment reflects the downsizing of the manufacturing base and the shift of US manufacturing away from certain highly capital intensive industries such as basic steel and petroleum refining. These trends, of course, are only reflections of more deep-seated determinants of the patterns of industrial investment. Over the long run, maintaining a strong US manufacturing industry will require increasing the level of investment in manufacturing, not only in plant, equipment, and physical infrastructure, but equally important, in intangibles such as employee education and training, research and development, and networks of suppliers, customers, and other manufacturers.

▶ Business investment in new plant and equipment in the United States has grown at an annual rate of about $3\frac{2}{3}$ percent for the past two decades (see Figure 15). However, in the late 1960s, the proportion of that investment going into manufacturing, which had averaged about 40 percent in the post-World War II era, dropped rapidly and has more

Figure 12

US Manufacturing Trade 1991

Industry	Exports	Imports	Balance
TOTAL	$345,377.0	$393,070.0	($47,693.0)
Clothing	$3,211.6	$26,205.8	($22,994.2)
Vehicles/New Cars - Japan	$497.3	$20,387.7	($19,890.4)
Telecommunications Equipment	$9,965.8	$23,469.0	($13,503.2)
Footwear	$542.5	$9,561.0	($9,018.5)
Vehicles/New Cars - Other	$3,077.2	$10,853.1	($7,775.9)
Vehicles/New Cars - Canada	$6,189.5	$13,543.6	($7,354.1)
Toys/Games/Sporting Goods	$2,085.5	$8,823.6	($6,738.1)
Electrical Machinery	$29,935.2	$35,103.1	($5,167.9)
Other Manufactured Goods	$25,108.7	$30,064.2	($4,955.5)
Vehicles/Trucks	$3,869.2	$8,261.4	($4,392.2)
ADP Equipment: Office Machinery	$25,953.6	$30,064.3	($4,110.7)
Iron and Steel Mill Products	$4,214.1	$8,312.3	($4,098.2)
Gem Diamonds	$209.2	$4,006.1	($3,796.9)
Furniture and Parts	$2,113.2	$4,938.3	($2,825.1)
Travel Goods	$159.0	$2,345.3	($2,186.3)
Paper and Paperboard	$5,961.8	$8,024.4	($2,062.6)
Watches/Clocks/Parts	$225.3	$2,286.6	($2,061.3)
Textile Yarn, Fabric	$5,457.1	$6,990.8	($1,533.7)
Platinum	$313.8	$1,663.9	($1,350.1)
Metal Manufactures, N.E.S.	$5,169.2	$6,376.2	($1,207.0)
Pottery	$87.1	$1,244.8	($1,157.7)
Rubber Tires and Tubes	$1,272.7	$2,310.2	($1,037.5)
Metalworking Machinery	$2,706.3	$3,622.6	($916.3)
Plastic Articles, N.E.S.	$2,236.7	$3,115.4	($878.7)
Nickel	$217.9	$1,062.7	($844.8)
Optical Goods	$711.5	$1,485.5	($774.0)
Artwork/Antiques	$1,240.2	$1,980.8	($740.6)
Photographic Equipment	$2,926.2	$3,652.7	($726.5)
Wood Manufactures	$1,244.0	$1,907.8	($663.8)
Basketware, Etc.	$1,288.6	$1,913.0	($624.4)
Zinc	$39.4	$651.5	($612.1)
Glassware	$447.9	$938.0	($490.1)
Lighting, Plumbing	$874.0	$1,247.2	($373.2)
Motorcycles, Bicycles	$1,302.6	$1,635.9	($333.3)
Copper	$1,325.6	$1,600.9	($275.3)
Vehicles/Chassis/Bodies	$239.9	$406.8	($166.9)
Rubber Articles, N.E.S.	$574.5	$704.8	($130.3)
Silver and Bullion	$238.8	$366.2	($127.4)
Vehicles/Parts	$14,301.5	$14,073.0	$228.5
Chemicals - Dyeing	$1,647.5	$1,415.8	$231.7
Spacecraft	$257.3	(-)	$257.3
Glass	$1,127.8	$770.7	$357.1
Aluminum	$3,124.6	$2,409.1	$715.5
Chemicals - Inorganic	$4,102.0	$3,298.7	$803.3
Ships, Boats	$1,154.3	$248.1	$906.2
Chemicals - Cosmetics	$2,360.8	$1,417.3	$943.5
Gold, Nonmonetary	$3,295.1	$1,934.8	$1,360.3
Records/Magnetic Media	$4,263.0	$2,786.5	$1,476.5

Continued on next page

recently averaged about 36 percent (see Figure 16).

- Gross real investment by sector, which had been growing roughly at the same pace in manufacturing and in broad service sectors through the 1960s and 1970s, diverged sharply in the 1980s, with manufacturing falling sharply behind the others[13] (see Figure 17).
- The proportion of GDP devoted to private business investment in plant and equipment in the United States has lagged that of Japan and other countries for at least two decades (see Figure 18). During the latter half of the 1980s, the investment gap widened substantially, especially compared with Japan.
- In 1991, the stock of net fixed investment per worker in manufacturing industries averaged $56,000 (1987 dollars), as compared with an economy-wide level of $85,000.[14]
- Total public spending on worker training in the United States is estimated at somewhat less than 0.1 percent of GDP, as compared with about four times as great a proportion in France, Germany, and Italy. Japan, by contrast, spends only about 0.03 percent of GDP on publicly supported training. In Japan, a very substantial proportion of all employee training is paid for and carried out by employers.[15]
- The United States spends less on research and development (R&D) in relation to GDP than do several other leading industrial nations, and even less on nondefense R&D in

Figure 12

US Manufacturing Trade 1991 (Continued)

Chemicals - Medicinal	$4,606.2	$3,052.8	$1,553.4
Printed Materials	$3,578.8	$1,705.3	$1,873.5
Chemicals - Fertilizers	$2,980.0	$919.2	$2,060.8
General Industrial Machinery	$17,107.1	$14,422.5	$2,684.6
Power Generating Machinery	$16,967.5	$14,230.3	$2,737.2
Chemicals - Organic	$10,927.9	$8,156.8	$2,771.1
Chemicals - N.E.S.	$6,019.8	$2,123.0	$3,896.8
Specialized Industrial Machinery	$16,565.2	$10,914.2	$5,651.0
Airplane Parts	$10,263.6	$4,085.4	$6,178.2
Chemicals - Plastics	$10,322.4	$3,785.1	$6,537.3
Scientific Instruments	$13,487.6	$6,757.4	$6,730.2
Airplanes	$24,158.2	$3,436.1	$20,722.1

SOURCE: MBG - Washington & US Department of Commerce, Bureau of the Census

Figure 13

Major Commodities Traded by US and Japan

US Imports from Japan		**% Total**
	Vehicles	33.3
	Electric Machinery	21.2
	Machinery	21.0
	Instruments	6.2
	Top 4 (others <2%)	81.7%
US Exports to Japan	**% Total**	
	Machinery	13.5
	Electric machinery	7.8
	Air and space craft	6.0
	Wood and charcoal	5.6
	Top 4	32.9%
	Instruments	5.4
	Cereals	4.6
	Fish	4.2
	Tobacco	3.5
	Meat	3.4
	Organic chemicals	3.2
	Aluminum	3.2
	Oil	2.9
	Vehicles	2.8
	Inorganic chemicals	2.4
	Oil seeds	2.1
	Top 15 (others <2%)	70.6%

SOURCE: MBG - Washington & Bureau of the Census

Figure 14

US Competitiveness in Critical Technologies

Technologies in Which the United States is Strong

Materials and Associated Processing Technologies
- Bioactive/Biocompatible Materials
- Bioprocessing
- Drug Discovery Techniques
- Emissions Reduction
- Genetic Engineering
- Recycling/Waste Processing

Engineering and Production Technologies
- Computer-Aided Engineering
- Systems Engineering

Electronic Components
- Magnetic Information Storage
- Microprocessors

Information Technologies
- Animation and Full Motion Video
- Applications Software
- Artificial Intelligence
- Computer Modeling and Simulation
- Data Representation
- Data Retrieval and Update
- Expert Systems
- Graphics Hardware and Software
- Handwriting and Speech Recognition
- High-Level Software Languages
- Natural Language
- Neural Networks
- Operating Systems
- Optical Character Recognition
- Processor Architecture
- Semantic Modeling and Interpretation
- Software Engineering
- Transmitters and Receivers

Powertrain and Propulsion
- Airbreathing Propulsion
- Low Emission Engines
- Rocket Propulsion

Technologies in Which the United States is Competitive

Materials and Associated Processing Technologies
- Catalysts
- Chemical Synthesis
- Magnetic Materials
- Metal Matrix Composites
- Net Shape Forming
- Optical Materials
- Photoresists
- Polymers
- Polymer Matrix Composites
- Process Controls
- Superconductors

Engineering and Production Technologies
- Advanced Welding
- Computer Integrated Manufacturing
- Human Factors Engineering
- Joining and Fastening Technologies
- Measurement Techniques
- Structural Dynamics

Electronic Components
- Logic Chips
- Sensors
- Submicron Technology

Information Technologies
- Broadband Switching
- Digital Infrastructure
- Digital Signal Processing
- Fiber Optic Systems
- Hardware Integration
- Multiplexing
- Spectrum Technologies

Powertrain and Propulsion
- Alternative Fuel Engines
- Electrical Storage Technologies
- Electric Motors and Drives

Technologies in Which the United States is Weak

Materials and Associated Processing Technologies
- Advanced Metals
- Membranes
- Precision Coating

Engineering and Production Technologies
- Design for Manufacturing
- Design of Manufacturing Processes
- Flexible Manufacturing
- High-Speed Machining
- Integration of Research, Design and Manufacturing
- Leading-Edge Scientific Instruments
- Precision Bearings
- Precision Machining and Forming
- Total Quality Management

Electronic Components
- Actuators
- Electro Photography
- Electrostatics
- Laser Devices
- Photonics

Powertrain and Propulsion
- High Fuel Economy/Power Density Engines

Technologies in Which the United States is Losing Badly or Has Lost

Materials and Associated Processing Technologies
- Display Materials
- Electronic Ceramics
- Electronic Packaging Materials
- Gallium Arsenide
- Silicon
- Structural Ceramics

Engineering and Production Technologies
- Integrated Circuit Fabrication and Test Equipment
- Robotics and Automated Equipment

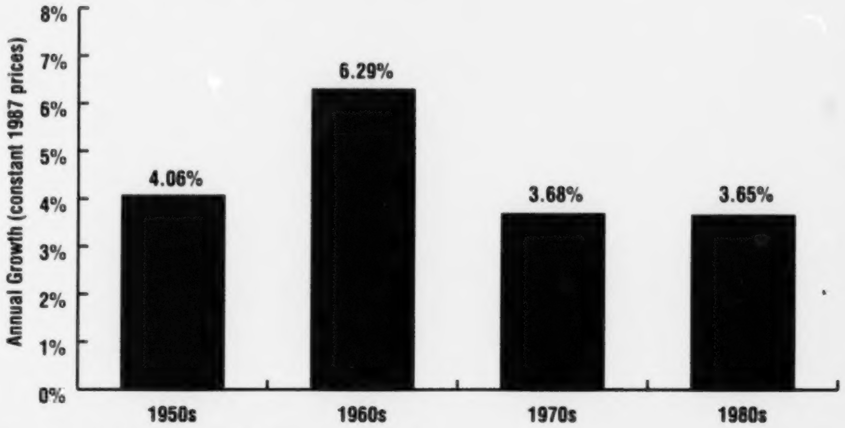
Electronic Components
- Electroluminescent Displays
- Liquid Crystal Displays
- Memory Chips
- Multichip Packaging Systems
- Optical Information Storage
- Plasma and Vacuum Fluorescent Displays
- Printed Circuit Board Technology

SOURCE: Council on Competitiveness, *Gaining New Ground: Technology Priorities for America's Future*, pp. 31-34.

relation to GDP (see Figure 19). Furthermore, in comparison with other national governments, the United States devotes very much less of its public spending on R&D to "industrial development" objectives (see Figure 20).

Figure 15

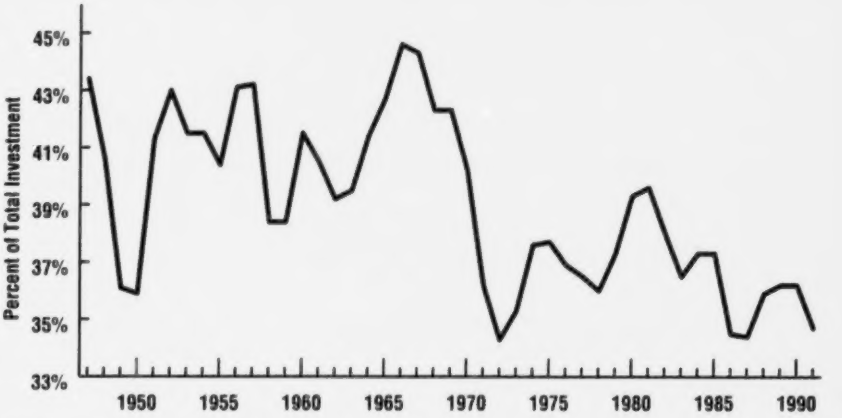
Business Investment in New Plant and Equipment



SOURCE: MBG - Washington & US Department of Commerce, BEA

Figure 16

Manufacturing Share of Business Investment in New Plant and Equipment



SOURCE: MBG - Washington & US Department of Commerce, BEA

The Opportunities of the New Manufacturing Paradigm

New approaches to management and organization of manufacturing operations are available that can lead to dramatic improvements in product quality, cost, and timeliness, and that can substantially improve the performance of manufacturing firms. Using These approaches requires changes in nearly every aspect of corporate strategy, management practice, utilization of people and of technology, and relationships to suppliers, customers, workers, and the community.[16]

▶ While some large firms and a few small ones have begun to employ substantially new and different approaches to managing and carrying out manufacturing tasks, many others lag behind in adopting these new approaches.[17] A special focus is needed on upgrading the more than 350,000 small and medium-sized firms upon which the performance of most larger manufacturing firms and the success of the nation as a whole depends.[18]

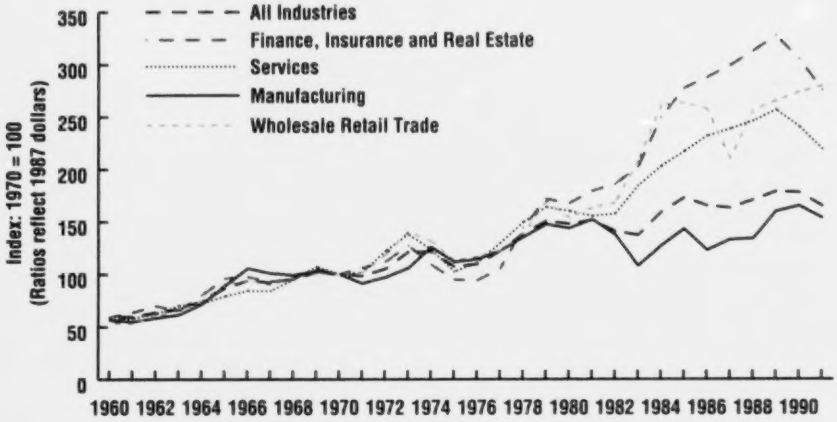
▶ To make use of these new approaches to manufacturing, not only must firms change, but the general public policy environment surrounding manufacturing industries must change in myriad ways as well.

▶ A substantial portion of the American public is concerned about these trends and seeks more active and aggressive leadership from business, labor, government, and educational institutions in developing effective ways to overcome these difficulties.

▶ The primary responsibility for

Figure 17

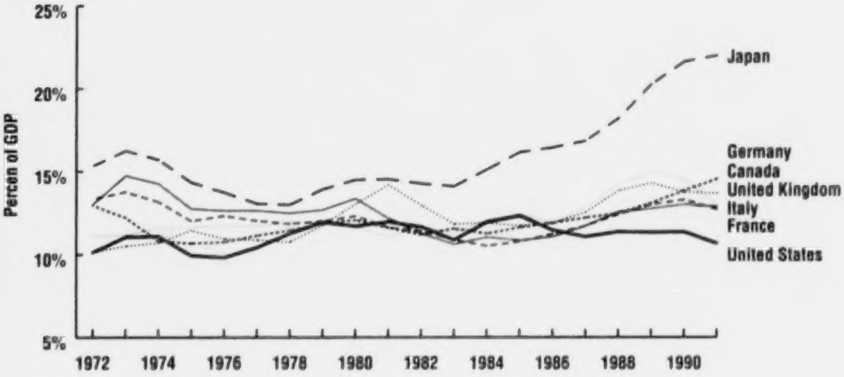
Gross Investment in Selected US Industries



SOURCE: US Department of Commerce, Bureau of Economic Analysis

Figure 18

Investment in Plant and Equipment

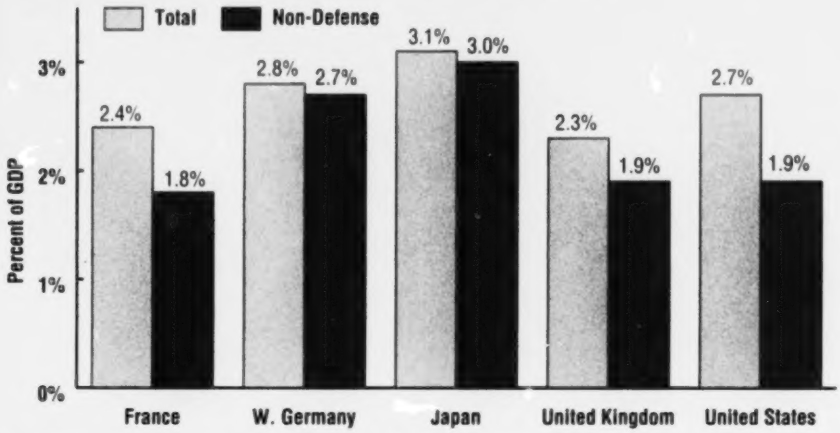


SOURCE: Council on Competitiveness

responding to the new competitiveness challenges lies with industry. Governments play important roles in affecting the economic and social climate within which industry works and in assisting in the provision of key inputs to industrial production, such as an educated workforce, generation of new knowledge, and elements of the public infrastructure.

Figure 19

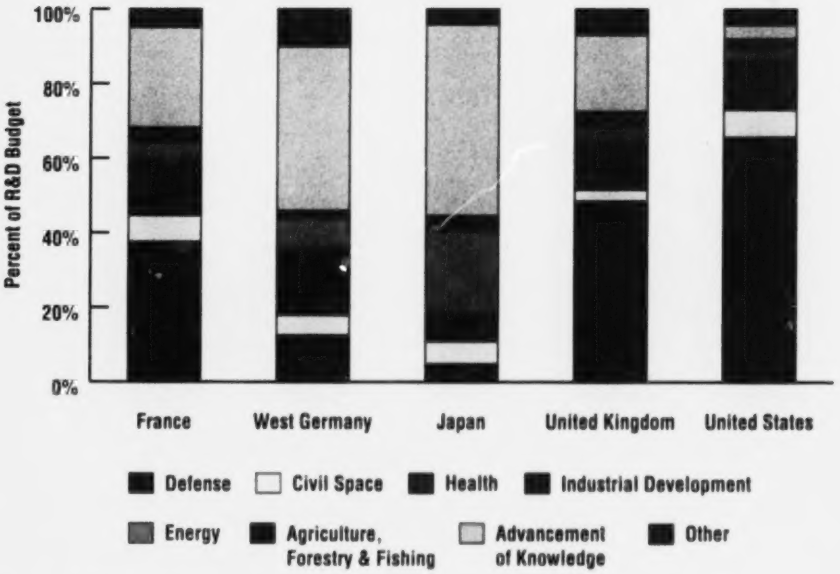
International Comparison of Total and Non-Defense R&D, 1990



Source: National Science Foundation, *National Patterns of R&D Resources*: 1992

Figure 20

International Comparison of Governmental R&D Budget Priorities, 1988



Source: NSF, OECD, and national sources for Japan

III. Goals for US Manufacturing Industries

To focus and provide a sense of the desirable magnitude of changes needed to revitalize and strengthen US manufacturing, the Manufacturing Subcouncil offers the following set of broad goals for the US manufacturing sector, some quantitative, others qualitative. These goals are intended to be "indicative," that is, they are intended to illustrate desirable outcomes, but the specific numerical goals should not be taken as precise in any meaningful sense.

Our overall goal for the year 2000 is to ensure that United States manufacturing industries maintain, or rebuild where necessary, a world-class competitive position as the core of a high-growth, wealth- and job-creating American economy.

Goals for Manufacturing Employment, Productivity and Output

Between 1993 and 2000, the United States should seek to create two million new jobs in manufacturing industries. In addition, manufacturing labor productivity in the United States should continue to grow during the 1990s the average annual rate of 3 percent achieved during the 1980s (see Figure 3).

In view of the continuing decline in manufacturing employment since 1979 (a loss of 2.9 million jobs between 1979 and 1992, see Figure 7), the continuing rapid rise in manufacturing labor productivity, and the continuing restructuring of manufacturing firms, an increase of this magnitude will require a substantial increase in manufacturing investment and a substantial increase in the market share of US-based manufactured products in world and national markets. Very roughly, returning manufacturing employment to the vicinity of 20 million jobs by the year 2000, while sustaining 3 percent annual manufacturing productivity growth, suggests growth in real manufacturing output of approximately 4.4 percent annually. By contrast, real manufacturing output grew by approximately 4.0 percent during the period 1981-1989 and by 2.8 percent during the 20-year period, 1969-1989.[19] Achieving 4.4 percent annual real growth in manufacturing output on a sustained basis will be a major challenge.

Consistent with the assumptions of the CPC, during the period 1993-2000, the United States should enjoy real annual economic growth of 2 percent per capita (or 3 percent annually in total, assuming 1 percent annual population growth), as compared with an average of 1 percent during the past decade.

If the private nonfarm workforce grows at the rate of population increase, or 1 percent annually, the total number of people at work would increase from about 108.5 million in 1992 to about 117.5 million in 2000. If the goal of 2 million new manufacturing jobs is achieved, the manufacturing workforce will grow from 18.2 million in 1992 to 20.2 million by 2000, and the proportion of the private nonfarm workforce in manufacturing will grow from 16.7 percent to about 17.2 percent, which would only return it to its level in mid-1990. Any reduction in the overall unemployment rate would tend to reduce this proportion because it would increase the number of people at work.

Goals for Investment in Tangible Manufacturing Assets

We expect the CPC to endorse an overall goal that the US seek to double the rate of domestic, private business productivity growth by the end of the century, from the average

1 percent during the 1980s to 2 percent during the 1990s.[20] This apparently modest goal for the nation as a whole would, according to CPC staff estimates, require an increase in the proportion of annual GDP devoted to tangible investment by about 4 percent, which would be an increase of about $230 billion per year by the year 2000.[21] Perhaps one-fourth of this would be devoted to public infrastructure investments, with the remainder, or about $170 billion, devoted to tangible private business investments, including but not limited to manufacturing. Smaller additional amounts would be invested in other, intangible assets, including education, training, and R&D, public and private.[22]

The Manufacturing Subcouncil believes that a significant portion of the remaining 3 percent of GDP (roughly $170 billion annually at today's level) should be made "available" for investment in tangible manufacturing assets if the CPC goals are reached.

The additional investment required to create two million new manufacturing jobs by the year 2000 can be straightforwardly estimated. While the average net fixed investment in manufacturing per person employed in 1991 was $56,000 (1987 dollars, or about $60,000 in 1991 dollars) as noted in Chapter II, the creation of an entirely new job in manufacturing is expected to require investment in fixed capital of $100,000 on average. Thus, creating two million new manufacturing jobs would require an additional investment over the decade of about $200 billion, or an average investment of about $25 billion (1991 dollars) annually over eight years. This estimate lies well below the CPC's estimated increment of $230 billion annually in total private investment by the year 2000. Thus, on this basis alone, manufacturing would require only about 10 percent of the total investment increase expected to be sought by the full Council.

We can examine whether the investment increment estimated above is reasonable by asking what the implications for manufacturing investment would be if (a) the full $170 billion increase in annual private investment sought by the CPC were achieved and (b) manufacturing's share of total private business investment were to increase from its recent average of about 36 percent to its historical high in the mid-1960s of 44 percent (see Figure 16). We proceed as follows.

In recent years, an average of 36 percent of private business fixed investment has been devoted to manufacturing (an actual $184 billion in 1991, or 34.7 percent of the total[23]). If this proportion were to return to 44 percent in 2000 and if, as envisioned by the CPC, total annual private business fixed investment were to grow by 3 percent of GDP, or $170 billion, by the year 2000 (from $530 billion in 1991[24]), then manufacturing investment might rise to 44 percent of ($530 + $170) or to about $308 billion in 2000 (all in 1991 dollars). This would represent an increase of annual investment in manufacturing of $124 billion by the year 2000. Clearly, the estimate of a $25 billion annual increment in manufacturing investment to sustain a growth of 2 million new jobs lies well below this "upper bound" projection of future manufacturing investment levels.

We conclude, therefore, that a goal of two million new manufacturing jobs is reasonable in the context of the CPC's draft goal for the increase in total private tangible investment by 2000. Achieving this goal will not be easy, however, and will require concerted actions on the part of industry within a supportive public policy environment.

Goals for Investment in Intangible Manufacturing Assets

Research and Development[25] — At present, US manufacturing industries invest approximately $76 billion annually in privately funded R&D, or about 1.3 percent of GDP. By contrast, Japanese industry spends the equivalent of about 2.0 percent of GDP on R&D and German industry spends about 1.8 percent.

These differences are consistent with the relative roles of manufacturing industries in the three countries' economies. (As noted in Figure 2, manufacturing's share of GDP in 1989 was 19.3 percent in the US, 31.1 percent in Germany, and 28.9 percent in Japan.[26])

If US industry had funded R&D in 1991 at the level of 1.9 percent of GDP to put it on an absolute footing comparable with Japan and Germany, it would have had to spend $35 billion more per year, or about $111 billion. While this target is probably beyond practical reach, it suggests that very substantial increases in industrially funded R&D would be desirable.

The Office of Management and Budget has estimated that the federal government devotes on the order of $1.2 billion annually to manufacturing-process and systems R&D for all purposes, including national defense, space, and processing of nuclear materials as well as commercial and other civilian manufacturing.[27] This is equivalent to about 1.8 percent of the annual federal R&D budget of the federal government. (No equivalent data are available for comparison with other countries.) We believe an increase in federally funded manufacturing R&D to 4 percent of the total, or to about $3 billion in 1992 dollars, by 2000 would be appropriate in view of the need to focus government's R&D efforts on helping to revitalize American manufacturing's technology base. Most of this increase should occur in civil, not military, space, or nuclear program areas.

Education and Training — America should set for itself the stringent goal of having the best educated and best trained manufacturing workforce in the world by the year 2000. Furthermore, we should seek to ensure that all American high school graduates are prepared either to enter higher education or to enter a well-paying job in manufacturing, services, or elsewhere. And, all American workers should have the opportunity to finance and enjoy access to training programs that enable them to reach their desired employment potential.

Goals for the Adoption of Best Manufacturing Practices

By the year 2000, a majority of US manufacturing firms should be using new manufacturing management practices, such as lean, flexible, total-quality-based, or "agile" approaches to manufacturing.

Every manufacturing firm in the United States should be able to access unbiased sources of expertise on the development, adoption and use of the best manufacturing practices and strategies from around the world, including those related to technology, operations, training, labor-management relations, network development, and so on.

Each manufacturer by the year 2000 should be able to arrange for common-carrier access to a nationwide digital electronic data exchange system and associated data bases to enable it to perform at the "agile" level of excellence.[28] Such a system would link enterprises, large and small; customers; suppliers; universities and other educational and research institutions; trade associations; and government-supported as well as private-sector organizations devoted to diffusing best manufacturing practices among industrial firms.

A majority of US manufacturing establishments should be located within a day's round-trip automobile travel from a regional center of excellence, a modernization assistance program, or a "teaching factory." Such bodies should provide technical and training assistance, as well as opportunities to demonstrate use of state-of-the-art advanced manufacturing equipment and systems.

Goals for the Integration of the Defense and Commercial Manufacturing Bases

By the year 2000, one-half of all defense procurements of goods and services, measured in dollar terms, should be purchased from commercial firms or from defense contractors on a commercial basis. The nation should set as its goal the seamless integration of the defense and civilian manufacturing bases except for certain well-defined national defense parts, components, and systems that have no civilian counterparts, such as nuclear weapons or submarines.

Defining Actions to Reach Our Goals

These are ambitious goals for American manufacturing industries to reach by the end of this century.

Nevertheless, they offer a sense of what is needed by the nation and they are targets against which to assess our recommendations. Chapter IV presents and discusses the Manufacturing Subcouncil's recommendations for public policy actions to strengthen US manufacturing. Alone, they are insufficient. In concert with the recommendations of the other subcouncils, including those designed to bring the federal budget deficit under control and to raise national savings, and in concert with aggressive actions on the part of all elements of the private sector, our recommendations are intended to achieve our overall goal of making US manufacturing industries the core of a high-growth, wealth- and job-creating American economy.

IV. Recommendations to Strengthen US Manufacturing

The Subcouncil decided at its first meeting to examine six major topics:

- ▶ Leadership for World-Class Manufacturing Excellence
- ▶ Enhancing Investment in Manufacturing Assets
- ▶ Education and Training for Manufacturing Excellence
- ▶ Accelerating Application of Best Manufacturing Practices
- ▶ Mutually Supportive Defense and Commercial Manufacturing
- ▶ Manufacturing as a Critical Technology.

To match the anticipated structure of the CPC report and to simplify the consideration of possible recommendations in overlapping areas, the categories used to classify the Subcouncil's recommendations in this report are as follows:

(1) Leadership for Manufacturing Excellence

(2) Investing in Manufacturing Assets
  A. Plant and Equipment
  B. People
  C. Knowledge and Technology
  D. Public Infrastructure

(3) Using Manufacturing Assets Effectively
  A. Best Manufacturing Practices
  B. Integrating Defense and Civilian Manufacturing
  C. Antitrust Treatment of Joint Manufacturing Ventures.

The scope of the Manufacturing Subcouncil's interests overlaps substantially with all of the other Subcouncils. Some of the areas of overlap — such as education, training, and technology — are less well-developed here in the expectation that they will be addressed by other subcouncils more thoroughly, while other important topics not addressed in this report at all — such as trade, corporate finance, and the federal budget deficit — are being addressed in detail by other Subcouncils.

1. Leadership for Manufacturing Excellence

Our nation's leaders — public and private — must step up to their responsibilities for ensuring the vigorous growth and competitiveness of the US economy. This is our dominant challenge into the next century — a challenge that is closely linked to our national security and foreign policy effectiveness and to our ability to create enough new high quality jobs to protect and improve the standard of living of this and future generations.

Strong leadership is essential and it must be widespread in federal, state, and local government; in business and industry (owners, directors, managers, employees, unions); educational and training institutions; professional associations; and many other private organizations.

The front-line operating responsibility for competitive performance lies with business and industry. Government at all levels has a strong influence on the ability of companies to perform effectively, as do educational and training institutions and other organizations. Government is responsible for developing an economic and social climate which maintains and enhances market competition while facilitating and improving the competitive performance of US companies. Government also has a major responsibility for the provision of key inputs to the economy, such as an educated workforce, generation of new knowledge, and the public infrastructure. All parties must understand the evolving nature of global markets and foreign competition and each must do its part.

High among our nation's economic goals is the creation of high-quality private sector jobs on a continual basis, especially jobs that pay higher-than-average wages by virtue of adding greater-than-average value to the resulting product or service.

World-class manufacturing industries and companies, small and large, are the foundation stones of a growing competitive economy and thus of the job-creation process throughout the economy. Other sectors of the economy, such as services and construction, are tightly linked to, and dependent on, manufacturing for markets, as well as for critical, state-of-the-art inputs.

Defining the role of manufacturing in the United States is not a new issue; in fact, the debate goes back to the late eighteenth century when Alexander Hamilton recommended a national commitment to manufacturing in his famous "Report on the Subject of Manufactures."[29] The largely agrarian politics of the time rejected his views and set the stage for nearly two centuries of a political attitude toward manufacturing ranging from benign neglect to overt hostility.

President Reagan's Commission on Industrial Competitiveness, the "Young Commission," brought to the nation's attention the challenge to American manufacturers in a new and forceful way. It set the stage for a plethora of studies, reports, blue-ribbon panels, legislative actions, and executive branch responses during the past half-dozen years.[30]

Since the report of the Young Commission appeared in 1985, a number of factors have militated against government taking a leadership position in favor of strengthening manufacturing:

- There has been some disagreement over whether manufacturing is in fact under severe challenge.
- The concern that direct government intervention would weaken market-based solutions led to a largely hands-off stance.
- Many manufacturers have been ambivalent about seeking government leadership in facing manufacturing's competitive challenge, due in part to concern over undue government intrusion in private markets. Furthermore, manufacturers frequently put a higher priority on streamlining and reducing government regulation and on forestalling the imposition of additional social demands on manufacturing firms than they do on building cooperative industry-government relationships.
- Populist and progressive constituencies have retained some of their traditional antipathy toward "big business."
- Most economists who advise on public policy have favored macroeconomic measures to address the health of the economy as a whole over micro- and structural policies that might overtly favor manufacturing.
- Some doubt whether government, even if well-intentioned, is capable of making the kinds of timely, market-responsive decisions that some forms of structural interventions might involve.
- The federal budget crisis has dampened nearly everyone's enthusiasm for measures to support manufacturing that would further widen the deficit, regardless of their positions on the other issues above.

We believe that these concerns must be understood and resolved and that the time has come to seek active participation and partnership of leaders from all sectors in strengthening manufacturing's performance, for the benefit of the economy as a whole, workers, communities dependent on manufacturing, and manufacturing industries. At the same time, each of the doubts raises a real caution that leaders on all sides need to keep firmly in mind. To this end we offer the following general recommendations regarding leadership for manufacturing excellence.

Recommendations

To make US manufacturing industries the "best in the world;" to emphasize the importance of manufacturing industries to America's future, including the creation of high-wage job opportunities; and to reinforce the effectiveness of ongoing changes in private-sector manufacturing firms:

Recommendation 1.
The President and the Congress should make improving and sustaining the performance of US manufacturing industries a central element of the nation's economic competitiveness agenda and should call for support to achieve this goal from leaders — public and private — throughout our society.

Recommendation 2.
Political, industrial (owners, managers, employees, unions) and educational leaders should seek common ground on a national manufacturing agenda based on a spirit of cooperation among all segments of American society. Priority should be given to the creation of high-quality, high-performance work organizations.

Recommendation 3.
Industrial trade associations should make the improvement of manufacturing performance through improved technology, labor-management practices, and management techniques a key element of their action agendas.

Recommendation 4.
Privately sponsored forums should be created for the exchange of views among high-level leaders and their associates on matters affecting the performance of US manufacturing industries.

The Agile Manufacturing Enterprise Forum of the Iacocca Institute at Lehigh University, the Manufacturing Studies Board at the National Research Council, and the private sector Council on Competitiveness are all examples of bodies that are playing an active role in supporting high-level dialogue and that should be encouraged to redouble their efforts.

We recognize that the specific tactics adopted by political, industrial, labor, educational, and community leaders will be affected by their personal styles, resources, and the need for manufacturing to fit coherently within a larger leadership vision to which each adheres. Thus, we choose not to detail these recommendations but offer them as idealizations of future paths to follow.

Implementing the spirit of these recommendations could yield high benefits to the nation and to manufacturing industries at modest direct, measurable costs. We know of no methodology that could be used to value their costs or their benefits, yet we are convinced that focused, informed, and committed leadership is both essential and highly cost-effective.

2. Investment in Manufacturing Assets

US investment in tangible and intangible manufacturing assets has been too low for many years. This shortfall, which results from many causes, is a leading factor in the loss of US market share in key manufacturing industries, with the attendant loss of jobs and new high-wage employment opportunities, not only in the manufacturing industries themselves but in the associated services and construction industries, and in other manufacturing-dependent parts of the economy.

Public policies should create incentives for greater *private investments* in manufacturing to enhance growth of productivity, output and employment in manufacturing industries. In addition, *direct public investments* in education, training, research and development, and infrastructure support the manufacturing sector.

The low level of manufacturing investment reflects both the pressure on the overall pool of savings that is available for private investment in the United States and a significant shift in the allocation of that pool over the past several years. The aggregate savings pool is squeezed by the general decline in private savings and the growth of public "dissavings" via the federal budget deficit. The allocation of savings away from manufacturing reflects both fundamental competitive market forces and the adoption of tax and financial regulatory policies that have made nonmanufacturing investments often more attractive than investments in manufacturing.

Enhancing the general climate for industrial investment in the United States will require both a renewed commitment to growth and the adoption of measures necessary to put our macroeconomic house in order for the long term. A key to achieving these goals, although by no means the only necessary step, is a sustained reduction in the federal budget deficit, which should bring down the cost of capital, thus stimulating demand and enhancing the return on investments in productive assets.

The Subcouncil on Capital Formation is addressing the entire complex of macroeconomic issues that influence the aggregate availability of savings for investment in this country. The Manufacturing Subcouncil will depend on the Capital Formation Subcouncil to make recommendations related to such matters as controlling the federal budget deficit, fundamental tax reform, controlling the growth of entitlement spending, and creating incentives for greater individual and corporate private savings. We look forward to their recommendations.

The Manufacturing Subcouncil does address recommendations to the CPC concerning tax and other policies that influence the *allocation* of the available pool of savings for investment to different investment objectives. One way to assess the adequacy of US manufacturing-related investments of various types is to compare US investments against those of competitor nations. Chapter II includes a number of comparisons suggesting that such investments are unfavorably low in the United States.

The changes in US investment patterns that are needed to foster manufacturing growth to world-class levels are not marginal — large changes are needed, demanding proportionate changes in both industrial behavior and government policies. On the order of $50,000 to as much as $200,000 of new investment is needed to create one additional manufacturing job, depending on the industry. Thus, creation of each million new manufacturing jobs in the United States might well require new manufacturing investment of $100 billion or more, over and above the investments needed to sustain productivity and quality improvements in existing manufacturing operations and to develop succeeding generations of industrial products. Thus, it is important to:

▶ take steps to increase private investment by reducing the corporate user's cost of capital (the investment hurdle rate) to manufacturing firms and by increasing the returns on investments in manufacturing assets;

▶ establish effective incentives for private investment in manufacturing assets;

▶ eliminate existing provisions of the tax code that discourage private investment in manufacturing assets; and

▶ reallocate or augment key government investments in infrastructure, new knowledge (research and development), and education and training so that they better complement private manufacturing investments.

To address issues associated with inadequate manufacturing investment, it is useful to consider recommendations in categories that are meaningful to the processes in Congress and the administration through which policies are made. We use the following specific categories of investment:

- plant and equipment
- people
- knowledge and technology
- public infrastructure.

It should be noted that government policies to increase manufacturing-related investments can create incentives and remove disincentives to private investments, or can take the form of public investments that complement private ones in such areas as infrastructure, education and training, and research and development.

Manufacturing policies should be selected and advanced in the recognition that industry and workers themselves are typically in a better position than government agencies to understand customer needs and market opportunities, competitor intentions, corporate strategies, existing and desirable new technological capabilities, and future plans.

Thus, in the absence of important externalities or other evidence of "market failure" or inadequate private performance, the Subcouncil generally favors private incentives over public programs on the grounds that they are likely to be more efficient, more effective, and less susceptible to special influence.

Finally, the Manufacturing Subcouncil must raise a cautionary note concerning the financing of new and additional government incentives and/or expenditures to assist manufacturing industries. Little will have been accomplished toward our long-term goals if general corporate tax rates are raised to "pay for" new incentives, if particular incentives now available to successful manufacturing industries are weakened, or if other new demands placed on manufacturers offset the benefits of any incentives or programs. In general, we advocate a shift of government incentives from consumption to investment, as well as the elimination of less-productive incentives for other sectors as the major modes of financing new manufacturing investment incentives. We caution the CPC and others that the enthusiasm of manufacturing leaders for any particular new proposal will depend heavily on how it is to be paid for.

A. Investment in Plant and Equipment

Investment in fixed plant and equipment in the US is low compared with key competitors and has been low for decades, whether measured in absolute terms or relative to historic trends or key competitors, especially on a per-worker or per-unit of GDP basis (See Chapter II). Recent studies show that investment in manufacturing plant and equipment is the primary vehicle through which new technology has its positive effects on productivity and efficiency of manufacturing. Studies by DeLong and Summers demonstrate that investment in manufacturing equipment is especially effective in stimulating economic growth at the national level.[31]

A key determinant of the level of investment in productive assets is the *corporate user's cost of capital.* This cost is defined as the minimum pre-tax rate of return that the corporate investor must earn to make the investment acceptably profitable, consistent with the investor's perception of risk, the cost of funds, and the cost of taxes and other on-going mandated costs that are similar to taxes. The Manufacturing Subcouncil finds that the user cost of capital has been substantially higher in the United States than in key foreign competitor nations for some years.[32] Since prevailing market interest rates are only one of several factors influencing the user cost of capital, action to reduce this determinant of investment must address factors in addition to interest rates.

The Manufacturing Subcouncil considered a number of recommendations to enhance investment in manufacturing plant and equipment. The most important criterion for selecting among them is that such incentives should be focused on the long-term, not on giving an immediate boost to the economy. For this reason, as discussed below, for example, we favor investment tax credits (ITCs) that are non-incremental and permanent, over those which are incremental and temporary. The rationale is that the ITC can offer a systematic and permanent reduction in the comparative cost of capital for *all projects*, thus offsetting some of the advantages enjoyed by other sectors and in other countries. Another criterion is that the policies should be straightforward and direct in their application. For example, this criterion pushed into a lower priority for future consideration the whole question of "integration" of the corporate and personal income taxes. Yet another criterion is to eliminate provisions of the tax code that discriminate in a major way against US-owned and in favor of foreign-owned firms doing business in the United States.

In view of these criteria, the Manufacturing Subcouncil put four recommendations to increase manufacturing equipment investment at the top of its list. These are discussed below. We then list three other options as possibilities for future consideration.

Priority Recommendations

Recommendation 5.
A permanent, first-dollar (non-incremental) investment tax credit of 5 to 10 percent of the costs of manufacturing production equipment should be adopted.[33]

Rationale and Design Considerations. The purpose of an ITC structured in this way (non-incremental) is to offset the relatively high cost of capital for *all* manufacturing investors, regardless of their historical investment patterns. In concert with the DeLong and Summers findings, it is focused on equipment, as opposed to plant, which brings much higher societal financial returns, and, to help overcome the existing biases in the tax code and other policies that favor services over manufacturing investment, it is limited to manufacturing production equipment.[34] Permanency provides investors with continued capital cost allowances, while being consistent with a long-term investment horizon widely favored on other grounds.

For a fixed loss in tax revenue, an ITC could be structured to be non-incremental or incremental, with several variants of the latter having been discussed.[35] The usual argument for making the ITC incremental is that its purpose is to stimulate additional investment and that the largest incentive will be felt by those contemplating investments over and above some historical trend. Similarly, proponents of an incremental ITC view making the credit available to all investment as an unwarranted and undesirable subsidy to investments that would have been made even without it.

There are, however, a number of arguments for applying an ITC on a first-dollar, non-incremental basis. First, at the level of an individual firm, most manufacturing investment decisions have to do with allocating an available pool of capital over a set of investment options, and the principal tool of allocation is the establishment by senior management of an administered hurdle rate that incorporates all the factors expected to affect the cost of capital to the firm, including tax policies and opportunity costs of alternative investments outside the firm. In this context, firms make no distinction between projects they would "do anyway" and marginal projects that would just get over the lower hurdle rate applicable to the "additional projects" that present themselves for decision after the floor at which the incremental credit becomes available has been reached.

Second, an incremental credit is not available at all to firms that are being forced to scale back investment plans due to downsizing — such as many defense firms in today's markets — or to low profitability — such as the auto manufacturers, while it rewards handsomely firms in growing markets — such as software. Similarly, the incremental credit rewards new entrants to manufacturing more than established firms.

Third, an incremental credit can create adverse incentives for firms to adjust the timing of new investments, for example, by making it worthwhile under some circumstances to delay new investments into the following tax year to maximize the increment above the baseline.

Benefits and Costs of an ITC. US manufacturers spent an estimated $129 billion on manufacturing equipment in 1991.[36] Had a first-dollar ITC of 10 percent been available to them, they could have claimed a maximum of $12.9 billion, without taking into account such technical details as carry-forward, carry-back, AMT, and so on. If the credit were successful, investment in future years would increase in response to it, so that the cost of the credit would increase as well. The resulting growth in corporate profits and in labor's wages, as well as in associated income taxes, would offset some or all of the budgetary cost of the tax incentive in future years. Depending on the structure of the credit and the nature of the industrial response, it is possible to design "self-financing" ITC concepts in the sense that they pay for themselves in the long run, if not in the short run.

We did not carry out an independent analysis of the benefits and costs of the ITC proposal described above, and we have not located an analysis of precisely the same model. However, other analyses of similar plans may be useful.

For example, the Manufacturers Alliance for Productivity and Innovation (MAPI) recently advocated a permanent, first-dollar, 10 percent ITC for all private business equipment purchases.[37] For the credit discussed by MAPI, the foregone tax revenues were estimated to be on the order of $50 billion annually. MAPI also estimated an increase in the rate of growth of GDP of 1 percent in five to, at most, ten years. For the current GDP of $5.7 trillion annually, if the increase in growth rates occurs linearly with time, the first year growth benefit would be between 0.2 percent and 0.4 percent of GDP, or approximately $6 to 11 billion, increasing to about $30 to 55 billion in the fifth year.

The National Association of Manufacturers recently testified regarding its simulations of the impact of a 10 percent ITC for equipment, finding an increase in GDP of $122 billion in 5 years, including a $104 billion increase in nonresidential fixed investment.[38] This ITC is apparently on a much broader base of qualifying investments than is our proposal.

Roger Brinner of DRI/McGraw-Hill estimated that his proposal for a permanent, incremental ITC for productive equipment would offer a sustained increase in national output of $30 billion annually in return for a revenue loss of $14 billion annually, of which $8.4 to 13.5 billion would be made up by offsetting receipts in future years.[39]

Recommendation 6.
The treatment of depreciation for income tax purposes should be modified to permit firms to depreciate manufacturing process equipment, newly installed after the adoption of this policy, at a rate such that the "tax life" of the equipment is equal to the "competitive life" as competitive conditions require.

In the rapidly changing manufacturing world of today, the time over which firms are permitted to depreciate manufacturing process equipment (usually five years) for tax purposes is often considerably longer than the competitive life of that equipment. It is not unusual for production equipment in fast-moving industries to be financially obsolete within two or three years. The result is that firms have to carry the costs of equipment they are no longer using, thus burdening the profitability of the newer production systems they have installed.

In its second annual report, the National Advisory Commission on Semiconductors (NACS) recommended that the depreciation life of semiconductor manufacturing equipment be reduced from five to three years, saying that "No other single recommendation would do as much to increase capital investment in the US semiconductor industry."[40] They estimated that such a change would increase annual capital investment in the industry by $450 million, at a cost to the Treasury of $180 million, without accounting for possible later productivity improvements and revenue offsets.

It is useful to put this proposal in international perspective. John P. Stern, Vice-President, Asian Operations, of the American Electronics Association, has compiled a table of allowable equipment lives for machinery used in the production of integrated circuits containing more than 100 elements.[41] Japan allows complete depreciation in 4 years for most of the more sophisticated items, in 3 years for a few, and in 5 to 10 for some of the more routine items. Furthermore, according to Stern, equipment used on more than one eight-hour shift daily can, under some circumstances, be written off in direct proportion to the number of shifts over which it is used, reducing the tax life essentially to one calendar year.

No estimates have been found of the revenue cost or investment implications of shorter depreciation lives for manufacturing equipment in general.

Recommendation 7.
Tax credits and deductions allowed under recommendations 5 and 6 should not be nullified by provisions of the alternative minimum tax.

Under the provisions of the Alternative Minimum Tax (AMT), firms that have been able to take advantage of tax credits and accelerated depreciation in prior tax years may be required to recalculate prior-year tax liabilities on a less-favorable basis in a year in which they qualify for the AMT. In view of the unpredictability of future financial performance and tax circumstances, this requirement is thought to introduce undue uncertainty into current year investment planning. Thus, it would be desirable to eliminate this provision of the AMT to encourage investment.

No estimates have been found of the benefits or costs of this proposal.

Recommendation 8.
Treasury regulations that require the apportionment of interest expenses between domestic and overseas operations for US firms operating in global markets should be rescinded or modified.

The tax treatment of the foreign source income of US corporations is exceedingly complex.[42] A key concern for some US-based multinationals has to do with the way in which interest expenses must be apportioned between domestic and foreign operations in the calculation of US taxes, including credits for foreign taxes paid. US law now requires the apportionment of essentially all of the corporation's interest expenses against income from domestic and foreign operations in proportion to the value of its assets at home and abroad. Since the interest costs apportioned to overseas income are not typically recognized as costs of doing business by foreign host governments, they are lost to the firm as deductible costs in all jurisdictions, thus significantly raising the return that must be earned on domestic investments (the "user's cost of capital").

Since these tax provisions raise the cost of capital for investments in the United States by US-based multinational companies, they create an incentive for them to make new manufacturing investments outside the United States and they put the US operations of US-based multinational companies at a substantial tax and cost disadvantage relative to US-based subsidiaries of foreign competitors.

An argument can also be made that the existing tax provisions give an incentive to US firms to keep all of their operations in the United States and that the undesirable effects on their cost of capital could be corrected if they were to move their operations back to this country. This argument, however, does not take into account that, in today's global economy, it is in the interests of both the nation and US firms to conduct operations both here and abroad so as to be able to compete effectively in international markets.

The Congressional Joint Tax Committee estimated that a legislative proposal to address this issue (H.R. 5270 in the 102nd Congress) would have cost the Treasury $5.9 billion over the five years from 1993-1997.[43]

Gary Hufbauer has offered a complex proposal for modifying the present unequal treatment of interest expenses for US-based and overseas-based multinational corporations.[44] It reflects a compromise between (1) attempts to apportion all interest payments to the purpose and location for which the underlying debt was incurred, and (2) the allocation rules that follow from the concept that all debt payments are fungible without regard to the location of the investments. Hufbauer offers no estimates of the overall costs or benefits of his proposal.

Additional Recommendations

As noted, the Manufacturing Subcouncil focused on Recommendations 5-8 discussed above to encourage greater investment in manufacturing plant and equipment. We note here without further discussion three additional proposals that deserve mention.

Recommendation 9.
A proportion of capital gains should be free of income tax on assets invested in start-up firms and held for a minimum period.

Recommendation 10.
Personal income originating from capital gains on equities in private

businesses should be indexed for inflation prior to the calculation of capital gains tax liabilities. Alternatively, such gains should be taxed at lower rates if the equities are held for longer periods.

Recommendation 11.
Individual owners of corporate equities and debt instruments should pay personal income taxes on dividends and interest income at ordinary rates, and corporations should not be taxed at all on net income distributed to shareholders and bondholders in the form of dividends and interest ("integration" of corporate and personal income taxes).

B. Investment in People

Investments in the education and training of the manufacturing workforce are increasingly essential to effective manufacturing performance, especially as the equipment used and the products made in manufacturing firms grow ever more complex and sophisticated. The responsibility for financing education and training falls on individuals, localities, states, employers, and the federal government, and all must share in its cost and in assuring its appropriateness and quality. Below we offer recommendations for action in support of education and training relating to manufacturing needs at all levels.

Government incentives and/or requirements for worker training should take account of the fact that an important part of such training occurs on the job, outside formalized training programs, as well as of the fact that many firms already make substantial investments in employee training. At the same time, important competitor nations, on average, spend more than and, in some cases, are better organized than the United States for employee training.

The Manufacturing Subcouncil notes the contributions of the Education and Training Subcouncils to these areas and seeks to avoid undue overlap with them. The reader is referred to their reports for additional recommendations and analysis.[45]

Recommendations

Recommendation 12.
Employers should receive a corporate income tax credit for expenditures on employee education and training programs. A permanent, first-dollar credit of 10 percent of training expenses is suggested. (Employers should give priority in such programs to production workers and first-line supervisors.)[46]

Employer-provided and paid training can be expected to be more immediately useful to both employee and employer than government-supplied training of general interest. Training in the context of current employment is thought to offer greater motivation to workers who participate and to provide more immediate benefit to employers and workers than training that is not related to the current job.

At the same time, employers cannot be certain that newly trained employees will not take their new skills to other employers who have not paid for their training. In principle, paying a portion of the training costs through tax incentives to employers compensates them for this eventuality and works to ensure that a more nearly socially optimal level of training is carried out despite this significant externality.

Expenditures qualifying for a training tax credit should include the direct costs and the overhead associated with training and educational programs, as well as the costs of employees' wages and benefits while they are participating in such programs. In-plant training of the staffs of suppliers and customers should also qualify for the training credit. A "first-dollar" credit is envisioned, which would provide a permanent incentive for such programs, rather than the temporary incentive that an incremental credit would provide.

It is estimated that business, including manufacturing, currently spends about $30 billion annually on employee training.[47] Thus, a 10-percent credit would cost the Treasury about $3 billion in foregone revenue annually, plus 10 percent of the additional training expenditures that such a credit might induce. (We have located no estimates of the increase in training expenditures that might accompany this credit.) One should expect some creative redefinition of what constitutes training activity in order to qualify for the credit, but we think that the costs are likely to be more than offset by the benefits of an increased level of training expenditures by firms.

Such an incentive for education and training would tend to favor formal, identified training programs over integrated, on-the-job educational experiences, a not altogether desirable outcome. This can be expected in response to the difficulties of convincing the tax authorities that integrated activities actually constitute training activities.

Recommendation 13.
Individuals should be permitted to deduct from their income before taxes the costs of formal education and training activities that are intended to help them qualify for a new job, as they now can in connection with an existing job. Such deductions should be available to all taxpayers, including those who would otherwise qualify only for the standard deduction, up to a limit of $1,000 of education and training expenditures annually.

Individuals have strong interests in, and responsibilities to, continually upgrade their skills and to learn new ones in view of the rapidly changing nature of employment opportunities in the United States. Because assisting dislocated workers can be expensive for society at large, moreover, there is also a public interest in providing some incentives to individuals to do this.

However, under current law, individual taxpayers can only deduct costs of education and training related to maintaining their *current job or profession*. This proposal is intended to encourage individuals to invest in education and training that would qualify them for jobs or professions *different from* those in which they are presently employed, in order to facilitate greater workforce flexibility and adaptability to changing employment opportunities.

The proposal also would extend this tax preference to *all* taxpayers, regardless of whether they otherwise meet the test enabling them to itemize deductions. Such taxpayers are typically at the lower end of the income scale and this provision would thus reach directly to nonprofessional workers.[48] That this may be a desirable goal is suggested by the widely quoted projection that a typical American worker will hold an average of seven different jobs over a lifetime.

To prevent this provision from becoming a general subsidy for all education and training, it is limited to a total deductible amount of $1,000 per year per person (indexed to inflation), an amount that would be unlikely to finance, for example, a high school or college education or a part-time law student. Eligibility could also be limited to persons over 19 years of age and deductions could be denied for persons who are enrolled in secondary education. The problem with the latter approach is that it may disqualify some unskilled and semiskilled workers who most need assistance and encouragement.

The following is a rough cost estimate. There are about 110 million American nonfarm workers. If 1 in 10 were to claim this deduction each year, if the average claim were for the maximum expenditure of $1,000, and if marginal tax rates average 28 percent, the foregone revenue would be (110,000,000) x (0.1) x ($1,000) x (0.28) = $3.1 billion annually. (No data are available to support the estimated 10-percent participation rate.)

Recommendation 14.
Employers should be encouraged (under employment, civil rights, and other laws) to adopt appropriate, objective minimum standards for skills required of newly hired employees.

It is widely agreed among Subcouncil members that some employers often pay little attention to objective information concerning the skills and capabilities of potential, new, entry-level employees, especially for those without formal post-high school education or training. Factors leading to this circumstance include a belief that having earned a high school diploma does not offer reliable evidence of ability or skill in today's market, as well as a concern that the use of formal, objective employment tests may run afoul of anti-discrimination statutes or private suits under those statutes.

The Subcouncil believes that employers can help strengthen the standards movement in secondary education by adopting such requirements as part of the qualifications for entry employment and by seeking specific changes in legislation that creates undue barriers to achieving this goal, as needed. This recommendation is largely in the nature of an admonition to industry, rather than a call for statutory modification at this time.

The use of such standards as a basis for partial evaluation of potential employees should facilitate worker mobility, encourage schools to upgrade their curricula and to require more of graduating students, and give students a target against which to assess their own goals and performance. No estimates of monetized costs or benefits are available.

The administrative costs to implement such practices would be small, especially in the context of a wider adoption of a standards-based approach to the certification of secondary school graduates.[49]

Recommendation 15.
Federal agencies should cooperate with state and local authorities and the private sector in strengthening capabilities of the system of vocational and technical education and community colleges to focus on the needs of the manufacturing workforce.

The Manufacturing Subcouncil believes that the national network of vocational and technical training institutions and community colleges could be much more effectively exploited in helping to upgrade the skills of the American manufacturing workforce.

The United States invests major private and public resources in the post-secondary education of the half of all students who go on to college (and the half of those who earn a degree), but we invest much less and much less strategically in those who go directly into the workforce. The benefits of a better educated "other half" could make an enormous difference to the future ability of US firms to compete in world markets effectively and to pay the high wages required to maintain the American standard of living in the future.

The Manufacturing Subcouncil is not prepared to offer specific, detailed recommendations regarding how the system of vocational and technical education and community colleges can be strengthened.[50] However, we note that adoption of tax incentives for employer-paid or worker-paid training would tend to increase the demand for such services without direct intervention on the supply side. In addition to market pull effects, federal authorities should encourage reform of the vocational-technical education system through the Departments of Education and of Labor and by offering training guidance via the industrial modernization efforts discussed below.

The costs of strengthening local production-worker-focused education and training could be substantial. On the other hand, the social costs resulting from inadequate preparation of the half of all high-school students who do not go on to college are quite large — the cost of *not* having a stronger system in terms of workers' limited skills, difficulty in adapting to new jobs, and general social dissatisfaction is very high indeed.

Recommendation 16.
The National Science Foundation should establish a program to support graduate programs that combine concepts from engineering and management in the training of future manufacturing managers. Strong industry involvement should be a qualifying condition for such funds.

Traditional engineering education has tended to emphasize areas related to product development and design and to engineering analysis, rather than to the management and direction of manufacturing activities and enterprises. Similarly, traditional management education has tended to emphasize general management, not the management of technology-based production operations. The result has been that manufacturing operations have not been led by the kinds of highly-trained, skilled, and capable technical managers who have led companies' R&D, marketing, and financial activities.

Recently, several universities have experimented with new graduate programs for students experienced in managing technology and in leading manufacturing operations and enterprises.[51] This proposal seeks to diffuse this approach to more institutions. Its goal is to train about one thousand new graduates each year to assume positions of technical and managerial leadership in manufacturing firms, with subsequent improvements in management and performance over time that are impossible to quantify.

Federal funding should be available to such programs for a period of up to ten years, at up to $4 million per year in federal funds.[52] The participation of industry in such matters as teaching, program development, student guidance, supervision of internships in industry, and sharing of the educational expenses should be required of all grantee programs. A reasonable goal would be an NSF program that is phased in to support as many as 25 academic efforts, some with planning and start-up grants and others at a full operational level. A budget of some $75 million annually supporting 25 programs might graduate 1,000 or more new manufacturing leaders each year nationwide.

Recommendation 17.
The Manufacturing Technology Centers and similar programs of technical assistance to firms should include advice and information on employee training programs and training resources as regular parts of their assistance and referral services.

Firms that receive technical assistance on manufacturing and product problems frequently are found to need assistance with employee training and education as well. Industrial modernization services should be equipped to assist firms in locating appropriate sources of training and educational programs for their workers as part of their routine services. This recommendation and its rationale are detailed more completely under the discussion of best manufacturing practices, below.

Recommendation 18.
Eligibility requirements for federal training programs for displaced and/or disadvantaged workers should be simplified to facilitate broad participation.

The federal government currently offers a host of training programs focused on the needs of special populations of distressed or disadvantaged workers, including those affected adversely by foreign trade, by closure or relocation of federal facilities, or by virtue of distressed local economic conditions. Anecdotally, workers who wish to take advantage of such programs frequently encounter barriers in demonstrating that they meet the eligibility criteria, a showing that is often difficult to make in practice. Furthermore, it is not obvious that the public interest is served best by limiting access to such programs to workers from certain narrowly defined groups, since training is a useful response to many causes of employment difficulty.

In view of limitations on access to existing programs, it is recommended that eligibility requirements for such programs be redefined and that they be made available to a broader class of persons than can now regularly meet the criteria. Enlarging access to such programs can be expected to raise program costs as well as benefits.

C. Investment in Knowledge and Technology

US private and public investments in research, development, and transfer of manufacturing technologies are too low.[53] Not only do firms underinvest in R&D compared with competitors, but also they tend to underemphasize process-related R&D within their overall R&D portfolios. Federal R&D underemphasizes manufacturing process and systems objectives, and most of the funding for this purpose is focused on meeting unique federal missions such as space assembly, and processing and handling of highly radioactive and other special materials. Investment in the transfer of existing manufacturing technology and know-how to small and medium-sized firms is much lower in the United States than in competitor nations, and such transfer and technical assistance efforts are small and fragmented.

Interest has grown rapidly in the development and application of new manufacturing processes that use less energy and fewer and less-toxic materials, pose lower risks to workers, and are less harmful to the natural environment. R&D on such processes is assumed to be intrinsic to all the recommendations below and should not be seen as an "add-on" to "regular" R&D.

Recommendations

Recommendation 19.

A new permanent tax credit for corporate expenditures on R&D should replace the existing temporary incremental credit. The new credit, at a lower rate than the incremental credit that expired at the end of June 1992, should be available for all R&D expenditures by the firm, including those that occur "after the first article of production." A rate of 5 to 10 percent is suggested.

Since the Economic Recovery Tax Act of 1981, Congress has passed a series of temporary incremental tax credits for company expenditures on "research and experimentation." Originally set at a level of 25 percent, the credit has been scaled back to 20 percent in recent years. The definition of qualifying expenditures was originally set in an effort to target the credit on basic research, where the positive "externalities" of privately funded R&D are presumably the greatest. The credit has expired, or nearly so, on several occasions and has been one of the perennial "extenders" debated every 18 months or so in the Congress over the last several years. The present credit expired at the end of June 1992. Extension of the credit was incorporated in a tax reform bill in late 1992, but it failed when that bill was vetoed, despite the President's support for the R&D credit itself.

This proposal calls for a *permanent, first-dollar* credit for *all* R&D expenditures *at a lower rate* than the previous credits. Permanency is desired to permit long-term adjustments in corporate R&D budget levels in response to a tax preference which, under the off-again, on-again circumstances surrounding the credit over the past decade, has not always been taken seriously by corporate financial officials.

The advantage of a first-dollar credit over an incremental credit is that it will continue to provide an incentive for firms to fund more R&D than they otherwise would, even to firms that are downsizing (e.g., defense contractors or firms facing stiff foreign competition), firms that are growing slowly, and firms in cyclic markets.[54]

Applying the credit to *all* R&D will create an incentive to focus not only on fundamental research but also on the continuous improvement of processes and products — which is now much better understood than it was in 1981 to be at the heart of continued commercial success in high technology markets. Furthermore, much process R&D occurs after a product first goes into production as opportunities arise for continuous improvement in quality and cost. Thus, in view of the considerable positive externalities associated with process innovation, it is desirable to provide continued public incentives to R&D throughout the entire product cycle.

The definition of qualifying R&D is key to this proposal. In this regard, a first-dollar incentive imposes a greater challenge than does an incremental incentive. Several options are available. Current law requires companies to report R&D spending annually to the Bureau of Census on behalf of the National Science Foundation. Companies also report R&D spending to the IRS to qualify for immediate expensing under the 1954 Internal Revenue Act and public companies report R&D spending to the Securities and Exchange Commission on Form

10K. These reports tend to differ, sometimes by as much as 25 percent, due to the use of different definitions by the various agencies and due to different interpretations of them by respondents.

R&D spending reported on Form 10K may be least susceptible to "gaming" by reporting firms. Privately held firms reporting and claiming R&D credits would have to be treated differently.

The costs and benefits of the previous incremental R&D credit have been examined in several studies. The General Accounting Office found that the ratio of the immediate increase in R&D spending to the immediate loss of tax revenue is less than one, ranging from 15 to 36 cents of additional industrial R&D for each dollar of revenue loss.[55] Others have found that the response to the R&D credit is substantially larger, however, ranging up to a two-dollar increase in R&D for each lost dollar of revenue.[56] One determinant of these findings has been the incremental nature of the credit, along with its escalating base, both of which tend to weaken the credit's incentive effect.

Available estimates of costs and benefits address only the incremental R&E tax credit and its variants. One estimate for the impact of the first dollar, non-incremental, full credit advocated here is as follows. A credit of 10 percent against income tax liabilities for all industry-funded R&D during 1991 would have cost, at a maximum, 10 percent of total private industry R&D spending of $76 billion,[57] or about $7.6 billion. Since firms are expected to increase their R&D spending in response to the availability of the credit, the lost revenue would increase somewhat, reflecting the price elasticity of R&D spending. Further increases in foregone revenue might result from redefinition of activities not now called R&D by the firm in order to qualify for the credit. (Some such redefinition is thought to have occurred in response to the R&D tax credit when it was first adopted in 1981.)

Recommendation 20. Treasury Regulation 861.8 on the allocation of R&D expenses against foreign-source income should be rescinded.

Typical multinational corporations perform R&D both domestically and abroad. They may do R&D in overseas markets to be able to meet local market opportunities more readily, to access lower-cost R&D resources, to establish ties to the local R&D infrastructure, to help recruit top-quality foreign nationals as employees, to comply with host government performance requirements, or for other reasons. Treasury regulation 861.8 has the effect of creating an additional incentive for firms to move R&D offshore, by enabling them to achieve more favorable tax treatment overall by doing so. Since the Subcouncil believes that, all other things being equal, it is to the benefit of the United States for firms to do their R&D here, this regulation should be permanently rescinded.

Domestic R&D is ordinarily treated as an expense against income before taxes. However, on the theory that a portion of the benefit of such R&D is likely to accrue to firms via their foreign sales, beginning in 1977 the Treasury has sought to compel firms to apportion their domestic R&D expenses between their foreign and domestic operations, in proportion to some measure of their activity here and abroad, typically in proportion to gross income.[58] However, most other countries do not permit multinational firms to claim a proportion of US-located R&D as an expense against income earned there, with the result that firms lose the deduction under these circumstances. Plainly, the deduction can be recaptured by moving the R&D offshore.[59] Hufbauer quotes a Price-Waterhouse study to the effect that none of the major industrial competitors to the United States impose an R&D expense allocation rule similar to 861.8.

Firms would prefer not to have to allocate any of their domestic R&D expenses against foreign source income, while Treasury would prefer an apportionment based on gross sales. Since 1977, Congress has, through a series of temporary measures, imposed a moratorium on the implementation of this regulation, or has modified it in some years to reduce the adverse impact on US firms. However, in response to pressure on the budget, more recently Congress has adopted the "64-percent solution," in which firms can claim 64 percent of domestic R&D expense against domestic income and must then allocate the remainder according to gross sales.[60] The most recent legislative determination of how to limit the impact of section 861.8 expired on June 30, 1992. In late 1992, the Treasury promulgated an 18-month extension of the 64-percent solution pending completion of a study of the entire matter.

The Manufacturing Subcouncil recommendation is for a complete and permanent moratorium on the imposition of regulation 861.8. (We recommend against permanent adoption of the approach reflected in the 64-percent solution.) This would result in increased incentives for firms to do R&D in this country, with a resulting improvement in the competitive position of the nation.

It should be noted that Congress does not have to act to eliminate 861.8; the President or the Secretary of Treasury can take the action unilaterally since the regulation in question was originated by Treasury in interpretation of earlier legislation and not by Congress itself.

The congressional Joint Tax Committee has estimated the revenue cost of the 64-percent solution in comparison with the full implementation of 861.8 at about $600 million annually.[61] No equivalent estimates of the cost of a permanent moratorium have been found.

Recommendation 21.
Total federal government expenditures for manufacturing process-related R&D that complements private investment in commercial and defense manufacturing should be raised from the present $1.2 billion to the level of about $3 billion annually over the next several years through such agencies as the Departments of Commerce, Defense, and Energy; the National Science Foundation; and NASA. R&D consortia should play a key role in these programs.

According to an OMB compilation, the federal government today spends about $1.2 billion annually on manufacturing-process related R&D,[62] a sum that is small compared with a total federal R&D budget on the order of $70 billion. More than three-fourths of this federal spending is for national security objectives in DOD and DOE, and a considerable part of the remainder is intended for unusual applications such as robotics in space. A small, although growing, portion of the $1.2 billion can reasonably be said to be of primary interest to civilian manufacturing.

In view of the high spill-over benefits of process R&D and of the high national interest in improving manufacturing performance generally, we recommend that the amount of federal R&D funds devoted to manufacturing be increased to $3 billion annually over the next five years. Most of this increase would take place in or be supported by civilian agencies of government.

Some of the additional manufacturing R&D funds would be spent in selected government laboratories, but most would go to industry and to universities. Generally, in keeping with the public goods nature of process technology and know-how, consortia of firms, possibly including government laboratories and universities, are preferred performers.

The following are typical of programs, existing or under consideration, to which such funds might be allocated (illustrations of changes in specific program budgets are intended to be indicative of possible changes, not program recommendations).

- Expansion of the support of manufacturing process technologies by the Advanced Technology Program of the Department of Commerce to the level of $300 million per year.
- Expansion of support for research on manufacturing processes, systems, and socio-technical performance aspects at the NSF to the level of $250 million annually, including expansion of the engineering research center efforts in the field of manufacturing systems.

- Expansion of support for programs of large-scale cooperative manufacturing research through the Departments of Commerce and Defense (similar to and including SEMATECH and the National Center for Manufacturing Sciences) to the level of $500 million annually in total. Environmentally benign manufacturing and agile manufacturing systems are two promising areas for research.[63]
- Support for federal laboratories' expenditures on cooperative industrial manufacturing R&D via CRADAs (Cooperative Research and Development Agreements) with the federal laboratories at the level of $500 million annually.
- Expansion of DOD's manufacturing R&D programs to the level of 1 percent of the DOD procurement budget, or about $500 million annually.
- Increased support by the Defense Advanced Research Projects Agency (DARPA) of advanced defense manufacturing technologies, including dual-use technologies, to the level of $300 million annually.
- Other agency programs in the anticipated Advanced Manufacturing Technology Initiative for FY94 at the level of $650 million annually in aggregate.[64]

Recommendation 22.
The Office of Science and Technology Policy in the Executive Office of the President should convene a broadly-based reexamination of ways to enhance the opportunities for constructive dialogue on a continuing basis between industry and government on research and technology needs and priorities for industrial purposes.

It has become increasingly apparent that conflict of interest statutes and their interpretation by the agencies, along with the Federal Advisory Committee Act, have become barriers to effective dialogue between industry and government on a host of matters, and especially on R&D needs and priorities. In a recent white paper, an ad hoc committee under the sponsorship of the National Association of Manufacturers noted that this emerged as a major problem in connection with its efforts to engage in a discussion with industry officials around the construction of the advanced manufacturing initiative.[65]

However, the laws, regulations, and perceptions that have led to this impasse were established for generally accepted good reasons, and they should not be simply discarded, nor is this a likely outcome. For this reason, the new Director of the Office and Science and Technology Policy, in conjunction with the Office of Government Ethics and other concerned parties, should engage an expert panel, perhaps under the President's Council of Advisors on Science and Technology or its successor, to examine this issue and make recommendations for changes in legislation, rules, or practices to facilitate more effective interchange.

Several mechanisms may already exist to facilitate such conversations. For example, the new RAND Critical Technologies Institute attached to OSTP was established in part to create a channel through which industrial and other views can be systematically gathered. The National Research Council of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine was established nearly 80 years ago to serve as an expert advisory body on scientific and technological issues. The Competitiveness Policy Council has the authority to establish subcouncils that can host dialogues among industry, government, labor, academia, and the public interest, outside the framework of the Federal Advisory Committee Act. Each of these bodies should be consulted by any special study group convened to examine this issue by OSTP.

D. Investment in Public Infrastructure

While private industry has primary responsibility for the plant and equipment investments that are essential to modern manufacturing success, governments at all levels also have roles to play in investing in a wide variety of physical and intangible forms of public infrastructure, including transportation, communications, public health and safety, utilities, and certain kinds of information, standards, and testing activities.

The Manufacturing Subcouncil anticipates that the Public Infrastructure Subcouncil will address national needs for greater investment in traditional infrastructure, such as highways, rail, airports, ports, energy and other utilities, and the like. It also expects that the Critical Technologies Subcouncil will address needs for greater public investment in advanced technology infrastructure. Thus, the Manufacturing Subcouncil has confined its attention to specific kinds of new public infrastructure of special importance to manufacturing.

Recommendations

Recommendation 23.
It should be the policy of federal R&D and communications regulatory agencies that manufacturing firms in the United States have access to a common-carrier, broad-band, high-capacity, integrated digital information network by the year 2000.

Many efforts, both public and private, are underway today to make high-capacity, digital information network services available to a wide variety of users. These are typified by the NSF National Research and Education Network, by the Bush Administration's High Performance Computing Initiative, utility installation of ISDN capabilities, and private installation of limited-access fiber optic cable systems. Observers agree that an important missing element is a national vision including a commitment to universal access to the network on a common carrier basis.

It is also agreed that most of the physical investment in the network will be made by private parties, but that regulatory action, or even legislation, would be helpful in resolving the many conflicting claims for user access, producer access, and exploitation of existing physical investments, as well as in establishing interface and operating standards to facilitate new private investment. Furthermore, it is generally agreed that there is a need for public investment in research and development on both devices and systems. In addition, the peculiar economics of the production and dissemination of information suggest that, in the long run, digital libraries will need some degree of public subsidy or very careful attention to the design of access fees to ensure full cost recovery to information suppliers.[66]

All that is suggested in this recommendation is that a national policy framework be established within which specific policy decisions can be worked out. A vision for a system, along with certain access (universal and low cost) and performance (digital, integrated) goals, should be adopted to give shape to future efforts in the private and public sectors.

3. Using Manufacturing Assets Effectively

Investments in manufacturing assets, tangible and intangible, will yield maximum return to firms and society only when they are used effectively. In fact, recent studies indicate that firms are able to achieve substantial increases in productivity, quality, sales, and responsiveness to changing market conditions, in some instances without major investments in new plant and equipment, by adopting and using new approaches to employee relations and employee training, management practices, technology strategies, customer and supplier relations, and so on.

It is essential that the government encourage firms to invest in and adopt "best manufacturing practices" in their own operations and that the government itself become a "world-class customer" when it acts as a buyer of manufactured products. For different reasons, two special populations of firms warrant particular government focus: small and medium-sized firms, and firms in the defense industries.

Small and medium-sized firms face difficult and costly problems in searching for, discovering, validating, and implementing better manufacturing practices of all types, whether they be use of technology, labor-management practices, firm strategy, customer-supplier relationships, investment strategies, or other. The relatively large magnitude of these "transactions costs" often leave such firms in less-than-optimal circumstances unless help is forthcoming from external sources, one of which may be government programs.[67]

On a related front, the nation is presently sharply reducing its investments in, and purchases from, the defense industries, even as the capabilities of those industries could be turned to meet important national needs. Furthermore, practices and rules have grown up around the defense sector that inhibit its full and effective integration with the commercial sector to the advantage of both. Removing these obstacles to integration can make both sectors more effective and efficient while also facilitating the transition of parts of the defense industry to commercial and other civilian purposes.

Finally, joint production ventures, particularly those involving small firms or firms in industries with narrow and specialized markets, such as national defense, are increasingly attracted to joint production ventures as natural follow-ons to joint R&D activities. As was the case for joint R&D in the 1970s, however, substantial uncertainty persists concerning the status of joint production under the antitrust laws. Action is needed to clarify the conditions under which joint production will be deemed acceptable to antitrust authorities or will survive private legal challenges under the antitrust statutes, to enable firms to use manufacturing assets most effectively.

A. Best Manufacturing Practices

Our understanding of what constitutes best manufacturing practices regarding firm strategy, management practices, employee relations, and use of new technology is undergoing rapid change. New and better manufacturing practices are under development and in use in the United States and abroad. Some US firms have profited greatly in recent years by systematically benchmarking their operations and products against those of competitors at home and abroad.

A few large firms, or parts of them, are developing and/or using this new understanding effectively, but many firms, especially small and medium-sized firms, are not yet competent in the new methods. There are important barriers to identification, validation, and adoption of improved manufacturing processes, and private market forces do not always lead firms to change effectively or rapidly enough.

Some large corporations have aggressive programs to assist their suppliers and customers in developing and adopting world-class manufacturing practices. These efforts should qualify, where appropriate, for investment incentives, and should be recognized and encouraged via such mechanisms as the Malcolm Baldrige Quality Award.

State governments and educational institutions are increasingly providing such assistance to small and medium-sized firms, usually under the rubric of "industrial extension" or "industrial modernization," and often with a strong technology flavor. Industrial modernization has recently been defined by some of its closest students as follows:

> "...industrial modernization means the application of upgraded technologies, design, manufacturing, and marketing methods, improved quality control systems, and enhanced management and training to raise productivity, quality, product performance, workforce skills, and company manufacturing capabilities to best practice international levels."[68]

Federal programs, after a halting beginning in the mid-1960s, have begun to focus on providing technical and financial assistance to specific industrial assistance efforts organized and managed at the local, state, and regional levels. Other federal programs offer business strategy and financial advice, as well as direct financial assistance. These efforts are not well-coordinated with the technology- and manufacturing-focused programs.[69]

Recommendations

Recommendation 24.
Federal investment in new and existing programs such as NIST's regional Manufacturing Technology Centers and other kinds of federally supported centers,

should be expanded substantially and focused on existing activities at the local and regional level that include industry and local educational or other institutions.

The purpose of this recommendation is to reinforce the efforts of states and regional bodies to help private firms, especially the 350,000 small and medium-sized manufacturing firms in the United States, make use of new management practices, new technologies, and new approaches to employee relations.

The Subcouncil believes that every firm, agency, institution, and individual has both an opportunity and the responsibility to examine and learn new ways of conducting productive enterprises. We also believe that government assistance, judiciously organized and sparingly applied, can make an important difference to the rate at which firms learn about and use new approaches to production. In view of the dynamic adjustments now underway overseas and of the rapidly changing nature of both market demand and competition, the federal government has a duty to assist, especially small and medium sized, firms in recognizing and using the new approaches to production. The *diffusion of "best practices"* offers too much potential for immediate and mid-term improvement in the international competitive position of US industry for us to ignore its potential to enhance the effectiveness with which manufacturing investments are used.

Firms learn about new production practices from various sources, including customers and suppliers, competitors, overseas visits, and vendors of equipment and training programs. In recent years, states and local interests, encouraged and sometimes aided by the federal government, have "extended" technical and business assistance to small firms to help them upgrade both their technologies and their management practices. These activities have been based loosely on the long and successful experience with agricultural extension in this country. Our vision of such services is that they work much as a broker, a reference librarian, or a medical general practitioner — they can diagnose and interpret firm needs, but they provide only limited specialist services on their own, while making referrals to experts who have a wide variety of technical and business expertise. Thus, such services are a complement to private and other public vendors of services, technical information, and products — not a substitute for them.

Compared with the evident and expressed need for modernization services, and compared with similar efforts among major industrial competitors, the United States has a relatively limited commitment to this important area.[70] Most prominent at the federal level is a set of seven Manufacturing Technology Centers sponsored and partially funded by the National Institutes of Standards and Technology in the Department of Commerce. The total federal support for these centers was about $17 million in FY 1992, with each of them supported by additional state, local, and private funds. State and local governments have been active in industrial modernization services, especially during the last decade, although most of their efforts are focused on business assistance to nonmanufacturing firms. Shapira and his colleagues report that a survey by the National Governors' Association found that states and localities spent approximately $41 million on industrial extension in 1991, while $15 million dollars was made available to such programs from private sources and from program income.[71]

The Subcouncil recommends a major increase in the federal commitment to modernization services. We recommend that the federal government continue to expand its support for such efforts over the next eight years, up to the level of approximately $500 million annually. These funds should be focused on support of pre-existing state, regional, and local organizations involving such partners as state and local governments; educational institutions at all levels; and consortia of local businesses, government laboratories, and nonprofit research and technology centers. As a rule, no more than half of the financial support for such centers should be from federal funds. Since the rationale for such support is based on the continuing need to upgrade and modernize American industry, we believe that the support of a program of modernization centers should be continuing as well, and we advise against automatic sunset provisions in modernization program grants.

Recommendation 25.
The federal government should strengthen and improve the coordination of the existing federal, state, regional, and local systems of diverse, sub-critical-mass programs of technical and business assistance to small and medium-sized manufacturers.

The plethora of existing federal technology, training, business assistance, export assistance, financial assistance, and similar programs is confusing to local interests and potential industrial users, as well as wasteful and duplicative. We recommend that a single agency of the federal government be given the charge to coordinate such efforts and to organize and offer "one-stop shopping" mechanisms through which the federal government can be reached by local and private interests.

One such agency could be the Technology Administration in the Department of Commerce, which already has authority to coordinate federal technology transfer efforts government-wide. Note that we do not intend that Commerce be given authority to host or operate all such programs, but only that it be empowered to coordinate them.

Recommendation 26.
The Department of Commerce or the NSF should support academic field research, teaching, and other scholarly inquiry into the rapidly changing nature of best manufacturing practices as deployed in industry in the United States and abroad and on their codification and dissemination via academic publications. This research should be carried out in cooperation with industry wherever possible and should include examination of the practices of foreign industries.

Recommendation 27.
The Department of Commerce or the NSF should support the collection, analysis, compilation of data bases for, and dissemination of, technical and related information for the improvement of manufacturing performance.

These two recommendations have closely related objectives: to improve the general understanding of what constitutes "best manufacturing practices" and to help in developing new practices. Recommendation 26 would work through academic institutions, such as schools of engineering and schools of management, as well as the new manufacturing education programs recommended above.[72] Recommendation 27 would strengthen the federal government's and industry's capabilities to understand the evolving nature of best manufacturing practices.[73]

Investing in developing, codifying, disseminating, and teaching about new production methods, especially the systemic, nonhardware aspects of production, can have very large payoffs for firms, workers, and the nation. Furthermore, they are relatively low-cost programs relative to, for example, investment incentives. Federal expenditures of a few tens of millions of dollars annually for these purposes could reap very large and almost immediate rewards for American industry.

As noted earlier in this report, best manufacturing practices are evolving rapidly. Having broken free of the conceptually powerful but obsolete mass production paradigm, firms at home and abroad are continually evolving new and better approaches to labor-management relations, product development, quality enhancement, customer-supplier relationships, and productivity improvement. It will not be sufficient for firms to adopt one of the currently popular approaches, such as lean production or TQM (total quality management), as a permanent solution to their competitiveness challenge. Production methodology has been irreversibly transformed from a static craft to be mastered into an ever-changing art to be continuously improved.

Put another way, by the time many American companies master the Toyota system of "lean production," Toyota is likely to have developed a new approach that will leave them behind again. Some observers suggest that the present economic adversity in Japan is already pressuring its leading car makers to go through yet another production revolution.[74]

The rapidly changing nature of production also demands a new attitude toward industrial standards. The old, autarkic approach to firm, industry, and national organization accommodated the use of standards to limit interaction and protect markets, both within the United States and in the international marketplace. The new, interactive approach to industrial production means that standards must be developed and implemented to minimize barriers and ensure the broadest access to markets. Thus, being first to market with a new technology and its associated new standards can offer great competitive advantage to the "first mover." As a consequence, both private and public standards organizations must be made integral parts of the networks of new manufacturing technology development, and must, like all the other parts, put maximum emphasis on reducing cycle time and maximizing fitness for customer need.

Standards-setting in the international arena is especially challenging for US industry, since the United States depends on a system for setting industrial standards based on private, voluntary associations, whereas most other countries establish standards through governmental bodies. Industry, the voluntary associations, and the federal government should cooperate in finding new ways for US interests to be more effectively and systematically represented in international standards negotiations.

B. Integrating Defense and Civilian Manufacturing

There are numerous reasons for seeking to reduce barriers between, and to better integrate, the nation's defense and civilian industrial manufacturing bases, especially in view of the projected reduction in defense spending over the next several years, the growing dependence of defense systems on commercial products, and the convergence of underlying technologies of defense and civilian products in such areas as flexible manufacturing systems, electronics, communications, software, and advanced materials.

However, a history of segregation of defense from civilian manufacturing, reinforced by procurement and contracting laws and accounting rules, has erected high barriers to such integration. Unless they are intrinsic to the special circumstances required of national security objectives, unnecessary barriers should be removed and incentives put in place to make mutually supportive the pursuit of both national security and commercial objectives.

To explore these issues in more depth, the Manufacturing Subcouncil convened a workshop of representatives of defense contractors, labor unions with membership heavily involved in defense industries, and independent experts to examine the barriers to defense-civilian industrial integration, conversion, and transition.[75] While the workshop was originally focused on barriers to the transition of defense firms into civilian markets, it ranged more widely over much of the debate about the future of the defense industries, their employees, and the communities in which they are located. The principal findings and recommendations of the workshop are summarized in Appendix A.

Recommendations

To remove artificial barriers that inhibit the better integration of the defense and commercial manufacturing bases and that inhibit effective transition of defense manufacturers to civilian production:

Recommendation 29.
The President and senior defense officials in the executive branch and Congress should make substantial integration of the defense and civilian manufacturing bases an explicit objective of national defense policy.

What is most needed in this area is an explicit recognition that integration of the defense and civilian industrial bases is in the national interest in terms of both economic competitiveness and national security. Preserving the nation's ability to produce large volumes of specialized military products in a time of reduced tensions and reduced procurement budgets will require increased dependence on the civilian industrial base. Similarly, the unique human, technological, and production capabilities of defense firms can be put to good use toward economic and other national goals as they are inevitably shifted out of doing national defense work.

One way to pursue this result would be for the Secretary of Defense to announce the intention to procure a certain percentage of future defense requirements from commercial firms or on a commercial basis. A goal of 50 percent by value by1997 seems not unreasonable. The particular goal, however, matters less than the annunciation of a vision that can shape a myriad individual purchasing decisions and guide those intent on revising procurement practices in the future.

Recommendation 30.
Specific changes should be made in contract, procurement, and related laws and rules affecting defense purchase of manufactured goods with the objective of maximizing the proportion of defense goods and services purchased according to best commercial practices.

Appendix A, which summarizes the Subcouncil's defense transition workshop, offers specific suggestions for change. The forthcoming report of the "Section 800 Panel" (DOD Advisory Panel on Streamlining and Codifying Acquisition Laws) is expected to make literally hundreds of detailed suggestions for modifying both law and rule to unburden defense procurement from the many constraints that now work to raise costs, inhibit competition, discourage commercial firms from entering the defense business, and create barriers to the exit of defense firms into other markets.[76]

Recommendation 31.
DOD regulations should be modified to remove restrictions and create incentives for using advanced manufacturing technologies developed in their IR&D programs. Restrictions on effectively employing such technologies on present and future contracts should be removed.

Private firms under contract to the Department of Defense, NASA, and the Federal Aviation Administration can recover a negotiated portion of their noncontract research and development costs (so-called "IR&D") as an element of contract indirect costs. The purpose of IR&D reimbursements is to help contractors finance R&D on the next generations of defense technology that may become the basis for future defense systems. Allowing reimbursement of IR&D costs is analogous to the practice of commercial firms of funding current R&D with a portion of what might otherwise be treated as profits.

Under acquisition and contract regulations, firms may not use recoverable IR&D funds to cover any portion of the direct costs of contracts to which they apply, on the theory that to do so would be equivalent to spending more on direct costs and less on indirect costs than what was negotiated in awarding the contract. In the past, firms have faced criminal charges based on allegations that they have so "subsidized" current contracts with IR&D funds.

The public purpose of this limitation is understandable under contract fairness and fraud principles. However, it creates an anomalous situation in which *process* technology developed with IR&D funds cannot be used to improve the productivity or reduce the costs of production for products made under current procurement contracts. Thus, the costs of production remain greater than necessary, or, what is even more anomalous, firms may not be permitted to use new manufacturing technology developed with IR&D funds that could improve product quality, reliability or performance.

This proposal would make it acceptable under the laws and regulations for firms to make use of new process technology developed with IR&D funds, regardless of whether those funds were connected with the current procurement contract. This no-cost proposal offers the possibility of lower-cost, higher-quality defense purchases.

Recommendation 32.
DARPA should continue to fund R&D on dual-use technologies that hold promise for future defense applications and that may also promise commercial applications.

DARPA has an important, even critical role to play as the centerpiece of DOD's advanced R&D for national security. That role should continue to be its focus. In addition, however, DARPA should be encouraged to support development of new technologies that hold promise for both national security and economic applications. In recent years, DARPA has, on occasion, been discouraged from supporting dual-use technologies, even when they may address future national security needs. In our view, evidence of potential commercial utility should not be used to screen out DARPA projects that are otherwise significant for national security needs. Whether a particular R&D program supports a dual-use technology is not easily determinable in practice; while some programs may be explicitly dual-use in character, many others will have important civilian technology implications, regardless of the goals of the program itself.

This proposal, as it stands, does not imply any increase in DARPA's expenditures for R&D. As part of Recommendation 21 concerning greater federal funding of manufacturing process R&D, we suggest that additional funds, up to $300 million annually within the next five years, might be made available to DARPA to support research on dual-use manufacturing technologies.[77]

C. Antitrust Treatment of Joint Manufacturing Ventures

Recommendation 33.
Production joint ventures should be treated like R&D joint ventures under the Sherman and Clayton antitrust statutes.

Under the 1984 National Cooperative Research Act, two or more firms in the same industry may conduct joint R&D without concern for procedural violations of the antitrust statutes if they file with the Justice Department and the Federal Trade Commission an advance notice disclosing the nature of the cooperative arrangement. This also protects them against possible treble damages in the event of the successful pursuit of a private action against the participants for damages under the statutes.

This recommendation would allow for similar filings and substantive protection in the case of production joint ventures under certain well-defined circumstances. Its intent is to allow firms to combine their production activities to achieve economies of scale, so long as the total output does not constitute an undue concentration of monopoly power. (Sometimes thought of as limited to about a 25-percent share of the total market to be held jointly by the participants.)

The benefits to firms of these changes would include lower average production costs due to the economies of scale that could be realized, the maintenance of smaller and/or less profitable firms that might otherwise exit the industry, and the preservation of competitive entities that might otherwise disappear while leaving the market to one or a few large, uncompetitive entities.

This proposal has only the modest implementation costs associated with maintaining the necessary records of filings. (A reasonable estimate for the federal direct costs would be on the order of $1 million annually, or less.)

Not quantified are the possible costs associated with market inefficiencies arising from any market power exerted by the participants through a joint production venture, whether related to short-run overpricing of products or longer-term decline in competition-driven efficiency improvements.

Notes

1. See, for example, Stephen S. Cohen and John Zysman, *Manufacturing Matters: The Myth of the Post-Industrial Economy* (New York: Basic Books, 1987). For a summary treatment of the arguments see US Congress, Office of Technology Assessment, *Paying the Bill: Manufacturing and America's Trade Deficit* (Washington, DC: US Government Printing Office, 1988) pp. 53-65.

2. US Congress, Office of Technology Assessment, *Paying the Bill: Manufacturing and America's Trade Deficit, op. cit.* The report estimated that 6.5 million US service sector jobs were directly dependent on sales to manufacturing industries in 1984.

3. Estimated using data in US National Science Board, *Science and Engineering Indicators: 1991*, (Washington, DC: National Academy Press, 1991) pp. 308 and 424.

4. Much of the data presented in this chapter was compiled from standard government sources by MBG The Business Information Company. See background material provided by Charles W. McMillion to the Manufacturing Subcouncil of the Competitiveness Policy Council, October 1992.

5. The Subcouncil has found nothing quite so contentious and frustrating as the debate over whether the United States in fact has a serious problem in manufacturing. (There is actually less debate about what to do among those who think something must be done, than there is between those who think there is a problem and those who do not.) Much of this debate, we believe, arises from often inconsistent and sometimes misleading uses of data to describe and assess the state of American manufacturing, both in comparison with competitors and in historical perspective. During the last decade, when the salience of these issues has grown both substantively and politically, insufficient attention has been given to nurturing the development of the concepts and statistics that undergird the competitiveness debate. Recommendations 26 and 27 in Chapter IV address this problem.

6. The specific quantitative percentage of total output accounted for by manufacturing in real terms depends artificially on the base year chosen. For example, during the late 1960s, manufacturing accounted for 32 percent of GNP in 1958 dollars, 26 percent in 1972 dollars, and 22 percent in 1982 dollars. For additional details see US Congress, Office of Technology Assessment, *Paying the Bill: Manufacturing and America's Trade Deficit, op. cit.*, p. 38.

7. Figure 2 is based on OECD data for gross domestic product (GDP). Historical data are not available for GDP similar to the GNP data in Figure 1.

8. Background material provided by Charles McMillion, *op. cit.*, citing US Department of Commerce, Bureau of the Census, *County Business Patterns* (Washington, DC: US Government Printing Office, 1991).

9. US Department of Labor, Bureau of Labor Statistics, "International Comparisons of Manufacturing Productivity, and Unit Labor Cost Trends, 1992," News Release, December 2, 1992, p. 9. The difference between the 3.0 percent reported for the United States for the period 1981-1988 in Figure 3 and 2.4 percent for 1979-1991 is due to the influence on the average for 1979-1991 of the inclusion of two slow-growth periods, 1979-1981 and 1988-1991.

10. These issues are discussed in McKinsey Global Institute, *Service Sector Productivity* (Washington, DC: McKinsey Global Institute, October 1992). This widely quoted study used several versions of the "purchasing power parity" approach to currency conversion in making productivity comparisons among nations, an approach which typically favors the United States, as compared with using foreign exchange market-based currency conversions. To avoid these complications, for certain industries, comparisons can be made of productivity levels in which output is measured in physical terms rather than by its monetized value. For example, Womack and colleagues report that, on average, US high-volume automobile producers operating in North America required 24.9 hours to assemble a car in 1989, whereas Japanese producers in Japan required 16.8 hours, and European producers in Europe required 35.5 hours. Japanese producers operating in North America required 20.9 hours. See J.P. Womack, D.T. Jones, and D. Roos, *The Machine That Changed the World* (New York: Macmillan, 1990) p. 85.

11. US National Science Board, *Science and Engineering Indicators: 1991, op. cit.*, p. 137.

12. Background material provided by Charles McMillion, *op. cit.*

13. Many reasons can be adduced for this change in investment patterns, including tax policy, the oil shocks of the 1970s, the rapidly changing value of the dollar in world markets, changes in the regulation of lending and financial institutions, perceptions of the declining future of manufacturing, and so on. However, these trends also mask important changes in underlying business practices, including outsourcing of service-like manufacturing functions, the growth of manufacturing equipment leasing, and the growth of contract labor markets. (Equipment leasing and contract labor are classified as services in these data, even though they may be direct substitutes for what would be classified as manufacturing activities if

they were done by a manufacturing firm.) The Subcouncil notes the need for more sophisticated analyses of such data by the cognizant statistical agencies to differentiate real change from artifact.

14. Background material provided by Charles McMillion, *op. cit.*

15. According to the US Congress, Office of Technology Assessment, *Worker Training: Competing in the New International Economy* (Washington, DC: US Government Printing Office, 1990) p. 89: "Employer-provided training in Japan contrasts sharply with that in the United States: large Japanese firms, and many smaller ones as well, pursue training with unmatched zeal."

16. The new approaches to manufacturing have been widely discussed. See MIT Commission on Industrial Productivity, *Made in America* (Cambridge, MA: MIT Press, 1989); Womack, *op. cit.*; National Center for Manufacturing Sciences, *Competing in World-Class Manufacturing*, (Business One Irwin, 1990); Iacocca Institute, Lehigh University, *21st Century Manufacturing Enterprise Strategy: An Industry-Led View* (Bethlehem, PA: Iacocca Institute, November 1991); National Academy of Engineering, *Manufacturing Systems: Foundations of World-Class Practice* (Washington, DC: National Academy Press, 1992); Christopher T. Hill, "New Manufacturing Paradigms - New Manufacturing Policies?" *Technological Forecasting and Social Change, 41* (1992) pp. 351-363; Steven Pearlstein, "Clinton Rides a Revolution's Trailing Edge: New President Can Nurture Business-Led Transformation," *The Washington Post*, January 17, 1993, p. H1.

17. Paul M. Swamidass, *Technology on the Factory Floor* (Washington, DC: National Association of Manufacturers, June 1992).

18. See Philip Shapira, *Modernizing Manufacturing: New Policies to Build Industrial Extension Services* (Washington, DC: Economic Policy Institute, 1990), and National Coalition for Advanced Manufacturing, *Industrial Modernization: An American Imperative* (Washington, DC: National Coalition for Advanced Manufacturing, October 1990).

19. Estimated from data on Figure 1.

20. The following discussion of economy-wide investment targets is based on preliminary CPC considerations that had not been endorsed by that body at the time of this writing.

21. These estimates do not include any impact on productivity growth of additional investments in intangibles such as education or research and development, nor do they take into account any impact on productivity of the improved management of productive enterprises recommended later in this report.

22. The Capital Formation Subcouncil is considering ways to make this additional amount of investment capital available to the US economy via policies that increase savings, reduce government net dissavings, and make investment on the whole more attractive. We do not address these matters here.

23. *Economic Report of the President* (Washington, DC: US Government Printing Office, February 1992) p. 357.

24. *Ibid.*

25. All R&D data are taken from US National Science Board, *Science and Engineering Indicators: 1991, op. cit.*, unless otherwise noted.

26. Since manufacturing industries account for more than 90 percent of private industry R&D funding (see Chapter 2), "parity" among the three countries would suggest that the ratios of industry-funded R&D to manufacturing industry output would be nearly the same. This ratio is estimated to be 0.067 for the United States, 0.069 for Japan, and 0.058 for Germany. On this basis, then, the United States is essentially at parity with Japan and ahead of Germany as reflected in the ratio of industry-funded R&D to industrial output.

27. US Office of Management and Budget, "Advanced Manufacturing Data Collection" (Washington, DC) March 18, 1991, mimeo.

28. See Iacocca Institute, *op. cit.*

29. Alexander Hamilton, *Report on the Subject of Manufactures*, Report by the Secretary of the Treasury to the United States House of Representatives, January 1790. The opening sentence of his report, written 200 years ago, might well have been written today, "The expediency of encouraging manufactures in the United States, which was not long since deemed very questionable, appears at this time to be pretty generally admitted."

30. For a bibliography of the more recent of these reports see Theodore W. Jones, "Categorization of Public Policy Recommendations for Manufacturing," Report to the Manufacturing Subcouncil, Competitiveness Policy Council (Washington, DC, Competitiveness Policy Council, October 30, 1992).

31. See, for example, J. Bradford DeLong and Lawrence H. Summers, "Equipment Investment and Economic Growth," Working Paper No. 3515 (Washington, DC: National Bureau of Economic Research, November 1990). They find that each 1 percent increase in the proportion of GDP invested in new equipment is associated with an increase in the annual growth rate of GDP of one-third of 1 percent. Applying this result to the current US economy of about $5.8 trillion dollars would mean that a permanent *shift* of 1percent of GDP toward investment in manufacturing equipment ($58 billion) would lead to a *net* increase in GDP of 1/3 percent, or $20 billion, each year.

32. The debate over the comparative cost of capital is contentious, largely because different studies and authors adopt different definitions for the cost of capital. Most arguments that there are little or no international differences in the cost of capital are based solely on the cost of debt, or, only somewhat better, on the cost of funds. The most authoritative assessment of the comparative cost of capital for industrial investments finds that US firms have had to earn as much as two or three times the expected rate of return as key foreign competitors, depending on the nature of the investment. [Robert N. McCauley and Steven A. Zimmer, "Explaining International Differences in the Cost of Capital," *Federal Reserve Bank of New York Quarterly* (Summer 1989), pp. 7-28.] Furthermore, these cost differentials have lessened, but persist to the present time. See: Steven A. Zimmer, "Cost of Capital and Technology: Where Do We Stand?" Statement before the US House of Representatives, Committee on Science, Space and Technology, Subcommittee on Technology and Competitiveness, March 3, 1992.

33. If a separate temporary credit is deemed desirable to stimulate short-term economic growth, it should apply for a minimum of two years and should be supplementary to the permanent credit.

34. Limiting the scope of equipment and/or plant to which the ITC would apply has a large impact on its benefits, costs, and cost-benefit ratio. Among the qualifying categories that have been discussed are equipment only, durable equipment except autos and fixtures, and "productive equipment" (generally durable equipment except autos and computing equipment used in the service sector).

35. One alternative is to offer an ITC for investments above a historical average, for example, of the prior three years. Another is to make it available for investments above a certain percentage, typically 80 to 90 percent, of the three-year historical average. Yet another alternative is to make the ITC available for investments above a certain percentage of the prior year's sales, with the percentage varying to reflect the capital intensity of the sector. Roger Brinner of DRI/McGraw-Hill, for example, recommends a 15 percent ITC for qualifying investments on certain classes of durable equipment above 2.5 percent of prior sales except for 5.0 percent in agriculture and energy industries and 10 percent for utilities. Roger Brinner, DRI/McGraw-Hill, unpublished manuscript, 1992.

36. Manufacturing investment in fixed plant and equipment was $183 billion in 1991, of which equipment's share was $129 billion. Telephone conversation with Gerald Moody, US Department of Commerce, January 8, 1993.

37. Manufacturers Alliance for Productivity and Innovation (MAPI), "The Case for a First-Dollar, Permanent Investment Tax Credit," PR-120 (Washington, DC: Manufacturers Alliance for Productivity and Innovation, June 1992).

38. Michael Baroody, Senior Vice-President, National Academy of Manufacturing, Testimony before the US Congress, House Committee on Science and Technology (sic), August 5, 1992.

39. Brinner, *op. cit.*

40. National Advisory Commission on Semiconductors, *Toward a National Semiconductor Strategy*, Second Annual Report, Volume I, (Washington, DC: National Advisory Commission on Semiconductors, February 1991) p. 15.

41. John P. Stern, "Technotax: How Japan's Tax System Spurs Technology," unpublished manuscript, Tokyo, Japan, 1991.

42. For a thorough analysis and proposals for reform see Gary Clyde Hufbauer, *US Taxation of International Income* (Washington, DC: Institute for International Economics, 1992).

43. Telephone conversation with Laramie McNamara, TRW Inc.

44. Hufbauer, *op. cit.*, Appendix E.

45. It should be noted that the Manufacturing and Training Subcouncils disagree on the desirability of a "play or pay" approach to employee training in which employers are required to spend a certain portion of payroll expenses for training or to pay the difference between actual expenditures and the ceiling into a federal fund that would support state and locally based worker training programs. This kind of proposal, endorsed by the Training Subcouncil, was rejected by the Manufacturing Subcouncil in favor of training tax incentives.

46. This is not the only reason for encouraging some public oversight of employer-paid training. As a rule, in a rapidly changing world, the individual employee has an interest not only in being trained for the current job but also in being educated to enable him or her to prepare for any of a variety of future jobs. The employer has a somewhat more parochial interest and the employee's interests may be well-served by continual expression of concern that training look beyond current needs.

47. Anthony P. Carnevale, "What Training Means in an Election Year," *Training and Development*, October 1992.

48. A refundable education and training tax credit for individuals for a maximum of $280 annually (equivalent to the value of the proposed deduction of $1,000 to taxpayers in the 28-percent bracket) could accomplish the same goal and still be available to all workers, including those whose taxable income creates little or no tax liability.

49. See the reports of the Education and Training Subcouncils for additional background on the potential role of

educational standards in education itself, in hiring practices, and in college admissions.

50. We look to our counterpart Subcouncils for recommendations on this point.

51. Flagship programs include MIT's Leaders in Manufacturing Program, Stanford's Professors of Manufacturing Program, and Northwestern's Masters of Manufacturing Program. Programs are also being established at such institutions as Cornell University and the University of Michigan.

52. MIT's program, which enrolls about 100 students in its 2-year program, spends about $6 million annually to prepare its 50 annual graduates, including the support of their research, tuition, stipends, faculty time, travel, internships, and related costs. The annual cost is similar to that for an MIT graduate student in a traditional engineering program.

53. "Manufacturing-related R&D" includes both R&D specifically on the *process and systems technologies* used in manufacturing industries and R&D leading to development and improvement of the technology embodied in the *products* of manufacturing industries. Unless otherwise noted, this section refers to R&D on manufacturing processes and systems.

54. The importance of these considerations in designing an R&D incentive is apparent from the fact that private industry spending on R&D has been essentially flat for the last five years [U.S National Science Board, *Science and Engineering Indicators: 1991*, *op. cit.*, p. 417], and from the continuing series of announcements of reductions in corporate R&D spending associated with downsizing of large firms such as IBM and General Motors, which supply a significant proportion of all private R&D funds in the United States.

55. US General Accounting Office, *Tax Policy and Administration: The Research Tax Credit Has Stimulated Some Additional Research Spending* (Washington, DC: US Government Printing Office, September 1989).

56. Martin N. Baily and Robert Z. Lawrence, Statement and Testimony before the US Congress, Senate Committee on Finance, April 3, 1987. Also, in a recent study reported on in *The NBER Digest*, January 1993, Bronwyn Hall found that the R&D tax credit raised private R&D spending by $2 for each $1 of lost tax revenue.

57. US National Science Board, *Science and Engineering Indicators: 1991*, *op. cit.*, p. 417.

58. For an extensive analysis and historical description of the evolution of this apportionment issue see Hufbauer, *op. cit.*

59. In recent decades, US firms have conducted in the neighborhood of 8 percent of their R&D overseas. Hufbauer, *op. cit.*, p. 85. This percentage has increased slightly over the past half-dozen years, perhaps reflecting a concern that the Section 861.8 allocation rules will eventually take full effect. The deductions could also be recouped by ceasing foreign operations and sales, but this would not be a desirable course for firms effectively engaged in international commerce.

60. This approach also allows for the apportionment of 64 percent of foreign performed R&D expenses to US income, with similar allocation rules applying to the remainder. Hufbauer, *op. cit.*

61. McNamara, *op. cit.*

62. US Office of Management and Budget, *op. cit.*

63. Environmentally benign manufacturing, or environmentally benign technology, would be excellent candidates for a FY95 FCCSET/OMB budget cross cut and funding initiative.

64. The Manufacturing Subcouncil would welcome the continued commitment of the Clinton Administration to implementing the planning that has gone forward for the FCCSET manufacturing R&D initiative in FY94. FCCSET should continue to execute budget cross cuts in priority areas in future years.

65. *Crafting a Common Manufacturing Agenda*, Report to the Federal Coordinating Council for Science, Engineering, Office of Science and Technology Policy, August 5, 1992.

66. The conceptual problem is simple — it can be expensive to create and maintain a data base of any kind, yet digital access can be achieved at nearly zero marginal cost, and copying of data in an archive can be very much less expensive than creating it originally. It is not clear that copyright or other intellectual property protection may be defined sufficiently well to ensure a rightful and necessary recompense to authors and collectors of digital information. Hence, public subsidy can be in the national interest in view of the broadly based benefits to be gained from access to such information.

67. A number of these barriers are discussed in Shapira, *Modernizing Manufacturing: New Policies to Build Industrial Extention Services*, *op. cit.* The same barriers may well exist in larger firms; the primary difference is one of economies of scale — in nearly every case small and medium-size firms would have to pay more than large firms in proportion to sales to maintain the necessary capabilities in-house.

68. Philip Shapira, J. David Roessner, and Richard Barke, "Federal-State Collaboration in Industrial Modernization" (Atlanta, GA: School of Public Policy, Georgia Institute of Technology, July 1992), p. 2.

69. Shapira et al., *op. cit.*, p. 22.

70. The budget for Japan's network of 169 "kohsetsushi" centers, which offer modernization services to small and

medium-sized firms, is approximately $500 million per year, counting both national (MITI) and prefectural government support. Philip Shapira, *Japan's Kohsetsushi Program of Public Examination and Technology Centers for Upgrading Small and Mid-Size Manufacturing Firms*, Report to the National Institute of Standards and Technology, October 1990.

71. Shapira et al., *op. cit.*, p. 59.
72. The studies by MIT's International Motor Vehicle Program provide one excellent model for the kinds of research and analysis we have in mind. These are summarized in Womack et al., *The Machine That Changed the World, op. cit.* The Alfred P. Sloan Foundation has recently funded 10 new university-based projects to do sector-specific studies of this sort.
73. The wide dissemination of good manufacturing practices by the winners of the Malcolm Baldrige Quality Awards is an illustration of a constructive federal role in this area.
74. See, for example, Karen Lowrey Miller et al., "Overhaul in Japan," *Business Week* (December 21, 1992), pp. 80-86.
75. "Workshop on Removing Barriers to Effective Defense-Commercial Industrial Transition," Summary Report, Manufacturing Subcouncil, Competitiveness Policy Council, Washington, DC, January 1993.
76. According to a recent article, it is anticipated that the panel will make a number of far-reaching recommendations, such as repeal of the Procurement Integrity Act, changes in the Truth in Negotiations Act to facilitate use of commercial practices, repeal of cost accounting standards, and changes to discourage companies from filing protests of government procurement actions. The panel's report is expected to be released in January 1993. See: "Panel Asks Changes in Acquisition," *Washington Technology*, November 5, 1992.
77. DARPA received an appropriation of $100 million for dual-use technology programs for fiscal year 1993, only a portion of which is expected to go toward manufacturing technologies.

Appendix A

Workshop on Removing Barriers to Effective Defense-Commercial Industrial Transition

Synthesis and Implications for Public Policy

The Status of the Defense Industries

▶ The defense industry is experiencing profound changes in its market. The changes underway represent a "sea change" in the circumstances of the industry, not a cyclic downturn. The government should let major change happen; in fact, it should mostly "get out of the way."

▶ Defense firms are changing much more rapidly than public policy is changing. They are downsizing for lower levels of DOD business, as well as investing and probing into nondefense government businesses as well as commercial businesses. Diversification and consolidation of major defense firms are proceeding rapidly without government help. Slow government action will not fill the gap.

▶ Nondefense markets include both commercial opportunities and other government agencies, as well as state, local, and foreign markets.

▶ Currently the defense industries are moving rapidly to ***separate*** defense from nondefense and commercial activities, even though the basic manufacturing processes are often the same. This separation is reinforcing, not reducing, the cultural differences between the two regimes. Most participants were quite pessimistic about the possibilities of real integration of the two markets.

▶ Defense engineers, and many managers, can adapt to the leaner, more cost and market sensitive world of commercial business, but must be given the direction.

Insights Into the Nature of the Defense Transition Challenge

▶ One must be realistic about the time needed to accomplish integration of defense and commercial industries — it will take at least ten to fifteen years. It is well worth pursuing aggressively, but it is not an answer to the challenge of the near term defense build-down.

▶ Defense firm diversification and creating new companies employing the human and financial resources released by downsizing are favored over "conversion" of existing firms from serving defense to civilian markets. To be successful in the current circumstances, new business activities involving displaced defense assets must take place ***outside*** the existing structure of the defense firms.

▶ Due to the diversity of the defense industry, transition and integration efforts will be more useful to some segments of the industry than others.

▶ The "patchwork" quilt of current congressional legislation to encourage defense firm conversion was not viewed as very helpful. For example, there must be a pull from the marketplace for new workers if training is to be successful. For some defense firms, transition is expected to be easier with less government intrusion.

▶ The generally weak US economy makes the processes of defense transition and conversion more difficult than they would be if the economy were more robust. Thus, stimulating the broader economy and assisting in the formation of new firms can help overcome the declining size of the defense business.

Barriers to Effective Defense Transition

▶ Closer integration of defense and nondefense business and manufacturing can be beneficial only if profound changes are made in DOD procurement legislation and practices.

▶ Administrative problems are important barriers to conducting defense business and to effective industrial base integration, but they are less important to firms transitioning out of defense and into commercial markets.

▶ Many of the administrative requirements imposed on DOD contractors, as well as on private firms that contract with other federal agencies, have been adopted out of well-intentioned attempts to curb abuse, ensure fairness, or pursue valued national goals. All of them impose costs on contractors that tend to make them less competitive domestically and in international markets; costs which such firms must bear as they seek to enter nondefense markets.

▶ Some of the administrative requirements are necessary to national security, but many — even some related directly to classification — are not and should be considered for modification or elimination.

▶ Protection of contractor data rights and adoption of activity-based cost accounting formats are absolutely fundamental to a competitive, vital, integrated industrial structure.

Proposals for Making Defense Transition More Effective and for Integrating the Defense and Civilian Industrial Manufacturing Bases

▶ The federal government should set quantitative goals for conducting defense procurement according to commercial practices. For example, it might be determined that 50 percent of such purchases should be made in this manner by the year 2000 or all of them by the year 2005.

▶ The federal government should set specific objectives for the purchase on a commercial basis or from commercial vendors of dual-use technologies and products such as semiconductor chips, aircraft engines, computers, and trucks .

▶ There should be an orderly, long-term, planned approach to defense budget reduction to enable the industry to adjust prudently in order to sustain the necessary defense industrial base while making an effective transition to other markets.

▶ One should think of defense diversification, rather than "conversion." New management approaches will be necessary for success — the history of such ventures by aerospace firms and other defense industries has been dismal.

▶ Government should focus its conversion efforts on people, localities, and small firms.

▶ There was a general distaste for large, command-type government programs to help firms make a transition from defense to civilian manufacturing.

▶ The roles of the federal government should include:

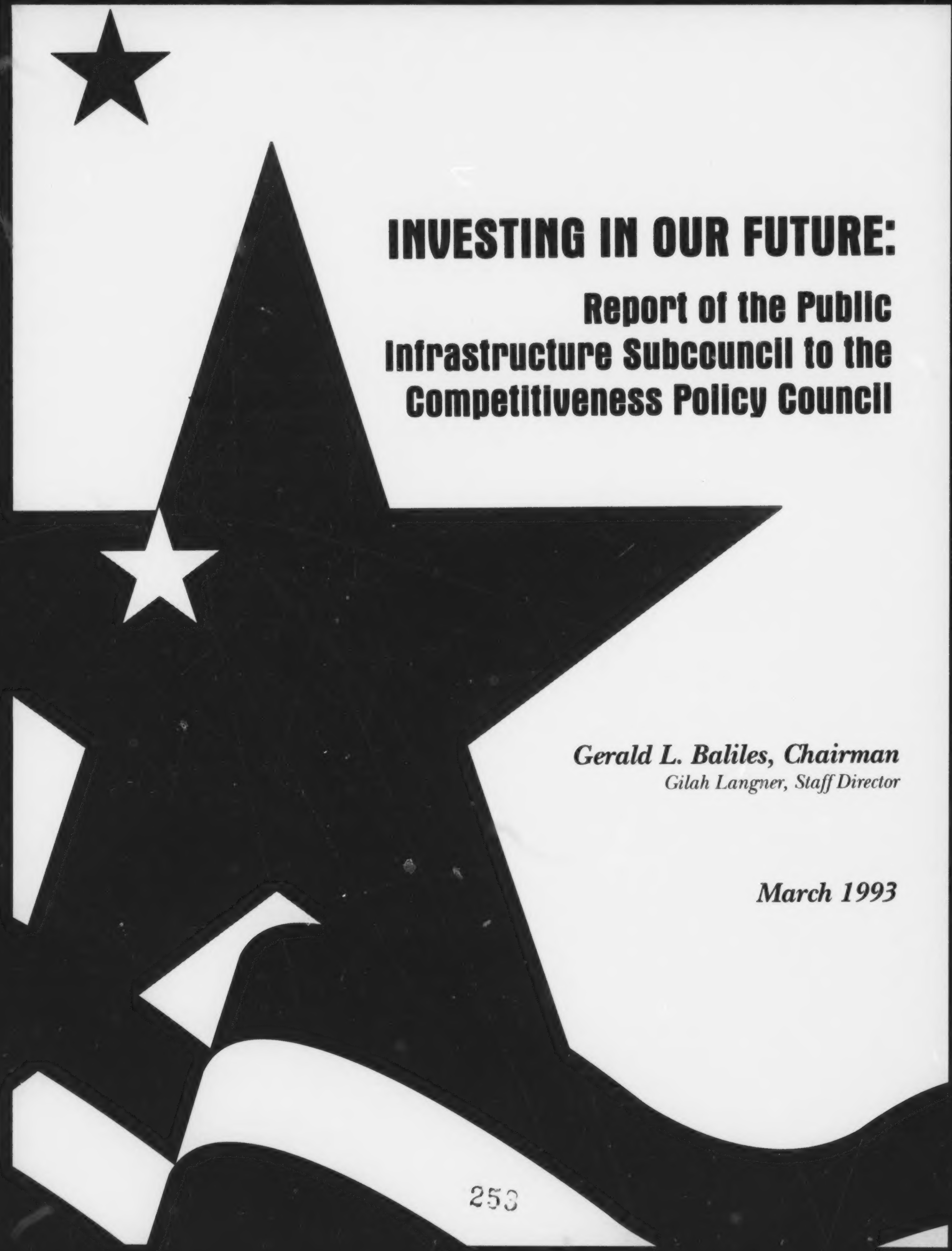
a. Assisting the creation of new ventures, which will generate most new manufacturing jobs. Government assistance to joint ventures between defense and commercial firms can help the former transition to new markets.
b. Investment incentives, working through the tax code.
c. Continued support for dual-use technologies, but with the realization that results will take years to solve important real problems.

▶ Industry-led R&D consortia can be extremely important in achieving a more competitive industry. Development of manufacturing standards is central to integration and efficiency.

▶ Government should seek to avoid engendering destructive competition between defense firms and government installations for a declining defense business.

▶ The existing government-owned and/or operated laboratories, arsenals, and depots often compete with private sector capabilities. This problem is growing as total resources shrink and government-supported jobs are protected at the expense of private ones. This situation should be further reviewed.

▶ The DOD civilian structure must be downsized substantially (by at least 50 percent) commensurate with the downsizing of the forces and of the industry that supports it. Otherwise efforts at "integration" and improvement of efficiency will be stymied.



INVESTING IN OUR FUTURE:

Report of the Public Infrastructure Subcouncil to the Competitiveness Policy Council

Gerald L. Baliles, Chairman
Gilah Langner, Staff Director

March 1993

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COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

C. Fred Bergsten
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Dear Fred:

It is with pleasure that I transmit the report of the Public Infrastructure Subcouncil, with a listing of recommendations for the Council's consideration. The Subcouncil was composed of over 30 prominent individuals from state transportation offices, the financial community, labor organizations, academia, public and trade associations, and the federal legislative and executive branches.

Three meetings of the entire Subcouncil took place (on July 30, September 24, and October 28), supplemented by numerous conference calls and smaller meetings of Subcouncil members, and circulation of papers by individual members. The active participation of members of the Subcouncil was integral to developing the ideas in this report. It should be noted, however, that the members have not been asked to endorse all the views and recommendations put forward.

Faced with our mandate and a short timeframe, the Subcouncil chose to focus on a few top-priority recommendations in the areas of transportation and information infrastructure. Although the topics we considered are complex and often technical, they also affect virtually all Americans every day of their lives.

In addition to the specific elements of infrastructure we focused on, other aspects of transportation — water and rail transport and trucking regulation — and other types of infrastructure are worthy of attention. A particularly important component of infrastructure is the nation's energy and environmental utilities, deserving of separate study.

This Subcouncil placed highest priority on identifying infrastructure needs that will enhance the country's competitiveness. There is an almost unlimited amount of maintenance, restoration, and construction that could be done on roads, bridges, and other facilities around this country. We have *not* tried to identify every pothole or road in need of repair.

Infrastructure is a critical element of our national competitiveness strategy. I strongly believe that the public will respond well to a new initiative in infrastructure if the government can show them where the money is going, and then deliver results. This report offers our recommendations for doing that.

Sincerely,

Governor Gerald L. Baliles
Chairman, Public Infrastructure Subcouncil

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Executive Summary

The Subcouncil on Public Infrastructure was convened by the Competitiveness Policy Council to produce recommendations for enhancing US international competitiveness by improving the effectiveness and efficiency with which we move people, goods, and information.

Investment in infrastructure is important for enhancing US productivity growth and for sustaining the long-term competitiveness of our national economy. Throughout our history, innovation and advancement in transportation and communications infrastructure — from the colonial King's Highway to the Wilderness Trail, from the building of the railroads to rural electrification, to the spread of the telephone and construction of the interstate highways system — have brought prosperity and progress. America thrives on the efficient movement of people, goods, and information, and stagnates without it.

Over the last 25 years, however, a massive *under-investment* in US infrastructure has occurred. Net public infrastructure investment has been cut in half — from over 2 percent of GDP in 1959 to just 1 percent by 1984. From 1980 to 1990, federal outlays on infrastructure fell from 4.7 percent of all federal spending to 2.5 percent. While there is no absolute "right" amount of infrastructure investment, the continuing and cumulative shortfall we have been experiencing must be corrected.

Infrastructure and Competitiveness

Numerous studies demonstrate the importance of infrastructure in America's economic competitiveness and productivity. Economists differ on the magnitude of the effect of infrastructure investment on economic growth; some argue that growth actually precedes, and makes possible, increased investment. There is, however, a general consensus that infrastructure investment and economic growth are intertwined, and that well-selected public investments in infrastructure can play an important role in furthering economic growth.

Beyond the economists, the nation demands improvements in our infrastructure. Americans daily confront the effects of infrastructure decline: congested highways, broken water mains, air traffic delays, reduced bus and rail service. Infrastructure investment sends the strong and unmistakable signal to the nation's citizenry that the government intends to invest in the future, that cities will not be abandoned, and that rural communities will have access to the nation's economic system.

Our international competitors are not debating the role of infrastructure in their own competitiveness strategies. They are rolling up their sleeves and getting to work. The Subcouncil recommends adoption of a three-point strategy to ensure that US infrastructure enhances, rather than impedes, our competitive edge:

(1) an aggressive program to maintain and improve transportation infrastructure;
(2) adequate and sustained financing of infrastructure investment over time; and
(3) decisive action to advance a new telecommunications infrastructure for the 21st century.

What follows is by no means an exhaustive list of the needs for action on transportation and telecommunications, or infrastructure more generally; they are simply our highest priorities in a long list of overdue investments. In each of these areas, the Federal Government must be both a leader and a reliable partner in the building and rebuilding of our infrastructure.

1. Transportation

Goal: *Maintain and improve the efficiency of our national transportation system.*

Transportation, when it works right, is the lifeblood of the American economy. When it does not, it is a stranglehold on our future. In a strong economy, efficient and effective transportation is not an option; it cannot be deferred indefinitely until tomorrow; it is an immediate and ongoing necessity. Congestion, deterioration, missing links, and obsolescence are real, costly impediments to productivity, health, and trade competitiveness.

Congress took an important step forward in strengthening our transportation system as a foundation of international competitiveness when it passed the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). But more remains to be done. All levels of government must approach the national transportation system from a strategic perspective of competitiveness. That strategy must encompass:

▶ an intermodal focus that provides seamless connections across modes of transport on air, land, and sea;

▶ an emphasis on efficiency and quality so that we get the most for our tax dollars;

▶ an understanding that the transportation system must serve the national interest in addition to being flexible enough to meet local needs (flexibility in making decisions is one of the key principles advanced in ISTEA);

▶ an accommodation of transportation and environmental interests, using creative thinking to actually *solve* environmental problems related to transportation; and

▶ a commitment to ensure that the transportation system reinforces rather than diminishes the economic vitality of the places it serves.

Surface Transportation

The nation's interstate system is virtually complete and an extensive infrastructure of roads, highways, and bridges is in place. Additional roads will doubtless be built in the future to service new suburbs and to provide necessary capacity extensions. However, environmental concerns, the cost of new rights-of-way, and land use considerations pose formidable obstacles to adding new roads. Attention must turn now towards an aggressive program to maintain and manage our existing system.

Our goals in this area can be summed up briefly: As a nation, we must stem the decline of the last decade by appropriate stewardship of our nation's transportation assets. We must extend the life of our existing roads and bridges while doubling the life expectancy of any new ones we build or rebuild. We must move forward rapidly with visible proof that America has begun to rebuild.

Congestion and physical deterioration are the two central problems of our surface transportation infrastructure. The Department of Transportation reports that over 50 percent of all roads were rated in "poor" or "low/fair" condition in 1989. Many roads and bridges today are being pushed beyond the capacity for which they were designed in terms of both the volume and technology of modern vehicles. Congestion on our highways alone has been estimated to cost $100 billion per year, not counting pollution and wear and tear on vehicles.

Our recommendations tackle the problems on several fronts:

▶ *Investments:* As a bare minimum, ISTEA (the Intermodal Surface Transportation Efficiency Act) must be funded at authorized levels. This would provide about $3 billion in additional funds for highways and bridges, for a total of $20.9 billion in FY 1993; and $1.6 billion in additional funds for public transit, bringing the total up to the FY 1993 authorized level of $5.2 billion.

Over and above ISTEA's authorized levels, the Subcouncil believes that substantial additional investment, reaching $12.5 billion, is needed well into the future to keep US roads, bridges, and transit in good working order and to keep America moving, safely and reliably. This level includes the following investments:

National Highway System ...... $9 billion

The National Highway System — consisting of about 155,000 miles of roads of national significance that will be designated under ISTEA over the next two years by the Department of Transportation — forms the basis for federal aid to roads and is the appropriate federal priority for competitiveness purposes. Funds should be allocated to improving capacity on existing NHS roads and bridges, and reducing the backlog of roads with significant pavement deterioration.

Other Bridges .... $1 billion

Since 1984 the number of structurally deficient bridges on arterials and collectors has increased by 25 percent; approximately 25,000 interstate bridges will reach the end of their design lives in the 1990s.

Intermodal .... $1 billion

Specific infrastructure improvements to both intermodal nodes (such as ports and airports) and links (such as highways and railways) must be identified in a strategic plan and systematically undertaken.

Transit .... $1.5 billion

The most urgent need is to upgrade systems and eliminate the backlog of deferred maintenance of public transit systems.

Total .... $12.5 billion

Again it should be stressed that this is not the sum total of the nation's needs for transportation, let alone other types of infrastructure; it merely indicates areas of top priority for competitiveness purposes.

▶ *Efficient Road-Building.* We must get more for our money when we build roads. We must substantially extend the life of our existing roads and double the life expectancy of new roads. The standards of road building should be upgraded so that roads last 40 to 50 years instead of 20 years. DOT should require higher standards of materials and encourage states to develop performance-driven specifications and use life-cycle costing.

▶ *Maintenance.* Continuing strong state commitment to maintenance is key to the success of the surface transportation system. The broadening of the types of preventive maintenance activities that ISTEA made eligible for federal funding should continue. Wherever feasible, infrastructure bonds and grants should contain a "covenant" or contract that lays out a schedule of maintenance that will keep facilities in good working order. Annual performance audits by an outside firm or a public reporting requirement on the status of maintenance activities should also be included.

▶ *Congestion Pricing.* States must be strongly encouraged to aggressively implement congestion reduction methods other than capacity extensions, to the point where state performance in reducing congestion should be factored into state allocation formulas. States instituting congestion pricing, high occupancy vehicle lanes, and other techniques that result in reduced vehicle miles traveled per person would receive an incentive bonus.

▶ *Public Awareness.* Efforts to build public awareness, understanding, and support for transportation projects must be given greater attention and more serious thought by authorities at every level of government.

Aviation

Airlines and their passengers have been suffering growing delays. In 1990, DOT reported that 21 primary airports were experiencing more than 20,000 hours of annual flight delays at a yearly cost to airline and US businesses of at least $5 billion. Congestion pricing is one mechanism that merits further attention as a means of addressing capacity constraints and delay problems.

More broadly, there is an overwhelming consensus in the aviation community that the air traffic control system, operated by the

Federal Aviation Administration, requires fundamental change if aviation's positive contribution to trade and tourism is to be sustained. The ATC system's capacity, level of modernization and cost have a direct effect on our competitive position. Several alternative models already exist which address issues related to strategic planning, funding, human resources management, and procurement.

It is imperative that a process be launched to identify and adopt an appropriate organizational model for the air traffic control system. This process must closely involve the FAA. The model selected should be the one which best meets the following criteria: safety; system capacity, efficiency, and on-time performance; accelerated research, procurement, and modernization efforts; direct and predictable funding opportunities; encourages strategic planning; and facilitates the recruitment, retention, training, and geographic placement of appropriate numbers of highly qualified technicians, procurement specialists, and operational experts.

Trade-Related Transportation

Our ability to engage effectively in international trade depends crucially on the nation's transportation system, as does the efficient movement of goods and services within the US economy. Fast, reliable, and inexpensive transportation reduces costs and delays, and can provide a competitive edge. For transportation to meet the goals of competitiveness, not only must each mode of transport work well, but the different modes must be connected in such a way as to provide a seamless network of working parts.

At the present time, gaps exist in intermodal linkages, particularly in rail links to highways and ports, ground access to airports, and inadequacies exist in major facilities in the system, particularly ports where the dredging of channels demands greater consideration as a transportation concern. The Department of Transportation (DOT) must be charged with creation of an intermodal strategy that will:

- identify existing and future trade flow patterns and corridors for major trade sectors of the economy;
- inventory the key intermodal linkages across the United States associated with international trade; and
- involve the states, local officials, and transportation and manufacturing industry representatives in developing a plan and priorities for addressing gaps and constraints.

The strategy should identify specific intermodal improvements that will enhance trade, and their cost. Pending DOT's cost assessments, the Subcouncil estimates that up to $1 billion may be needed annually to improve intermodal connections.

The Department of Transportation should also move quickly to get the Bureau of Transportation Statistics called for in ISTEA up and running. This will build the empirical foundation for serious attention to issues of transportation and competitiveness.

Transportation Technologies

Available, off-the-shelf technologies such as ramp metering and traffic signalization are still not adequately deployed by the states and localities. Innovative federal technical assistance to states and localities to adapt and deploy such technologies could go a long way towards improving transportation conditions. Long-term contracts and industry challenge programs are examples of such assistance.

Emerging transportation technologies — including intelligent vehicle and highway systems, high speed rail, and magnetic levitation trains — hold exciting potential for solving current transportation problems and opening new doors to efficient transport. The Subcouncil endorses the support for transportation R&D contained in ISTEA and recommends, for the present time, full funding at least at authorized levels. A pilot project to create regional technology councils should also be developed.

Reorganizations

Two key problems with transportation at the present time come about as a result of organizational structures. First, Congressional oversight of transportation matters is fragmented across multiple committees. More fundamentally, major transportation laws tend to focus on the requirements of a particular mode of transport rather than on the movement of passengers and freight as the *raison d'etre* of facilities and carriers.

The Subcouncil recommends the reorganization of transportation and public works functions under single Congressional committees to promote systematic consideration of intermodal issues and national competitiveness concerns in transportation infrastructure.

Finally, a continuing challenge to a rational, well-thought out public infrastructure system is the way in which infrastructure projects are funded and allocated. Put bluntly, infrastructure decisions too often begin and end at the bottom of the pork barrel. Despite the efforts in ISTEA to call for more rigorous planning, significant levels of funding were authorized for demonstration projects. These projects, while often worthy in themselves, have an ultimately counterproductive effect on the infrastructure system, doing nothing to dispel the public's sense of wasted money. Without addressing this directly, and reining in the tendency to use transportation funds as pork, public confidence in the legitimacy of the system will remain low.

The Subcouncil recommends creation of a bipartisan Infrastructure Commission to evaluate proposals for earmarking federal funds for demonstration projects, modeled after the Defense Base Closure and Realignment Commission. The Commission would present Congress with its list of nationally meritorious projects; the goal would be to limit federal demonstration project support to those with genuine national demonstration effect, such as pilot programs for new transportation related technologies.

2. Financing

Goal: *Ensure that investment in infrastructure is adequate, appropriately financed, and sustained over time.*

In light of the current deficit, serious proposals for infrastructure investment must contain their own financing plans. The Subcouncil strongly believes that consistent, stable funding is absolutely necessary for a productive infrastructure sector. We believe that the wisest course of action is to use a federal energy (carbon) tax or raise the gasoline tax to levels necessary to meet current and future infrastructure needs.

Since the bulk of the investments proposed in this report as top priorities are in the areas of highways and transit, there is an intuitive appeal to raising the gas tax and earmarking the revenues for transportation investments. Although gas tax increases have met resistance in the past, the tax is well-understood, relatively easy to implement, and has established revenue collection and management mechanisms. Other types of energy taxes offer other advantages.

Despite the unpopularity of raising taxes, the Subcouncil believes there is a growing understanding on the part of the public that our infrastructure is in need of investment. In the face of the current deficit, we cannot simply borrow the money needed; taxes must be raised to cover the necessary costs. As an example of what might be done, the current 2.5 cents of the gax tax that is used for deficit reduction could be reapplied to infrastructure and extended, and the federal gas tax itself raised another 10 cents and earmarked for infrastructure. That would supply funding for the top-priority transportation investments called for by the Subcouncil.

In addition to ensuring that adequate funds are available for infrastructure investment, over the long-term financing mechanisms must be put in place to rationalize the process of infrastructure investment. Such mechanisms would: (a) take capital outlays for infrastructure out of the federal operating budget; (b) facilitate rapid and flexible funding of infrastructure projects; (c) strengthen the selection process of infrastructure investment to work against "pork barrel" tendencies; and (d) ensure the reliability and availability of revenues committed to infrastructure purposes.

One such mechanism the Subcouncil strongly recommends is a capital budget, maintained by many other countries as well as by state governments in the United States. Merely creating a capital budget will not substitute for decision-making and priority-setting across categories of investment, nor will it ensure a reliable stream of funds for infrastructure. But a capital budget would make a step in the right direction by appropriately accounting for, and encouraging the financing of, capital investments over an appropriately long-term time frame. With the use of budgetary safeguards to prevent abuse of the system, a capital budget is an important and overdue tool to rationalize the investment process.

Another proposed long-term mechanism for financing public investment is the concept of a National Infrastructure Bank. While the Subcouncil made no final judgment, it did discuss the merits of such an institution. First and foremost, the Bank would serve as repository and manager of federal infrastructure trust funds, thus removing the political pressures to use trust fund monies to mask the federal deficit. The Bank could take on additional roles as well. For example, the Bank could be charged with evaluating and funding transportation demonstration projects; it could operate as, or in conjunction with, the Infrastructure Commission mentioned earlier. The Bank could also play a key role on projects of national significance, such as large-scale transportation projects, that do not currently receive adequate attention because their costs fall outside the scope of the yearly, short-term budget cycle.

Such a Bank would be a public institution, issuing securities with a market-determined, taxable rate of return, to be sold on the open market to finance infrastructure projects. The bonds would be backed by a dedicated revenue stream (e.g., the new tax on gasoline). Governance issues would need to be fleshed out in detail to ensure that the Bank does not play a duplicative policy-making role in determining investment priorities. The intent, rather, is for the Bank to serve as a financial mechanism available to federal agencies, for example, offering federal agencies market and risk criteria to help evaluate infrastructure projects, and issuing bonds for infrastructure projects.

The advantage of a National Infrastructure Bank would lie in its ability to leverage the revenue stream to raise large amounts of capital when needed for major projects. Thus, for example, if a gas tax increase were phased in with small annual increments, the Bank could issue bonds to raise required amounts of money in early years, to be paid off in later years with revenues from the gas tax increase. The market for the Bank's bonds would be both institutions and large private investors, with an attempt made to attract private and public pension funds (currently worth about $2.6 trillion). Under properly-controlled circumstances, the Bank could be authorized to finance additional infrastructure spending as a countercyclical measure during a recession; waive the state and local match requirements during such a period; and undertake other types of financing arrangements to attract private capital to invest in state and local infrastructure projects.

3. Telecommunications

Goal: *Seize the historic opportunity to advance new telecommunications technologies that will form the basis of infrastructure for the 21st century.*

The global information infrastructure is in a period of dynamic change and opportunity. Driving this change is the confluence of advanced telecommunications technology and the computer revolution. Decisive action by US policy-makers is critical in the immediate future if the nation is to take advantage of American technical know-how in key areas such as HDTV, fiber optics, and personal communication services.

Telecommunications superhighways could become as important for our nation's productivity, competitiveness, and individual empowerment as was the building of the US interstate highway system. Other countries, such as France and Japan, are moving ahead with strong government involvement in telecommunications progress, and in some cases, a commitment to the accelerated deployment of integrated broadband networks. Competitive advantages are likely to accrue to the countries that take greatest advantage of the new technologies.

The federal government's role in this area is different from traditional transportation infrastructure. The government is not being asked, nor should it offer, to pay for new telecommunications infrastructure. Nor will government support for particular technologies necessarily lead to the desired results in this fast-moving competitive environment. Instead, the federal government has two responsibilities: first, to speak with a unified and clear voice, and second, to define the new "rules of the game" as swiftly and soundly as possible.

The primary need is for a single, authoritative federal policy-maker on telecommunications, rather than the current melange that includes the Federal Communications Commission, the National Telecommunications Information Administration, the Defense Department, Judge Harold Greene, and Congress. New legislation replacing the 1934 Communications Act will be needed to effect this change.

The second requirement is for the government to move swiftly to define a coherent regulatory framework for telecommunications that will end the current gridlock, promote equitable treatment of companies, and safeguard the public's access to reasonably-priced telecommunications services. This will enable decision-makers, from the apartment dweller to the multinational corporation, to make choices among technologies and services with confidence. It will also allow American manufacturers to move rapidly in domestic and international communications markets. While encouraging private sector initiative, federal policy should also take steps to avoid creating a new class of the "information poor" to the detriment of our ability to field a competitive workforce.

It was beyond the scope of this Subcouncil to make specific recommendations on the new "rules of the game." It is clear, however, that ground rules are particularly needed in the following areas:

- the redefinition of common carrier obligations and the universal service commitment;
- the integration of First Amendment and privacy principles into networks of the future;
- the provision of public information services;
- clarification of intellectual property rights; and
- promotion of technical standards and interoperability.

As an actor in the field of telecommunications, the federal government should use its NREN (National Research and Education Network) program as a model and catalyst for network development, and conduct procurements of telecommunications systems with a view towards broader infrastructure implications. Government demonstrations of appropriate technology programs in different sectors can help empower individuals and organizations to participate in the new technologies. Small and medium-sized businesses should be able to turn to the federal extension service for help in sorting through the maze of telecommunications options.

Telecommunications systems are evolving in different ways at the state level, forming a useful laboratory of possibilities. But federal and state governments should continue to work together to see that no one system diverges too radically from the rest. The type of federal-state forum convened in the past by the Federal Communications Commission should proceed under the new Administration as it moves to shape substantive issues of network policy. The Competitiveness Policy Council can offer practical assistance in this field by convening a new Subcouncil to take a more detailed examination of telecommunications issues in 1993.

4. Short-Term vs. Long-Term Fixes

Infrastructure investment must not be held hostage to the debate over whether deficit reduction or economic stimulus should come first on the nation's economics agenda. The "either/or" choice is a false one. For too long we have ignored the economic impacts of deferred infrastructure investments or made them with no strategic plan in mind. As is true in infrastructure, in education, in training, and other areas, competitiveness is the result of strategic investments which combine to ensure our future security and prosperity. But such investments must begin *now*. The recommendations offered here give policy makers a clear way of seeing infrastructure as a long-term competitiveness issue, happily with short term results.

The President should make it a top priority to explain this approach to the American people. He should explain exactly where the money will come from, and where every penny the people contribute will be spent. And he should explain that, while infrastructure development is a powerful short-term stimulus, the development of a long-term, well-funded infrastructure program will help ensure the prosperity of the people and that of their children well into the next century.

I. Introduction

The Subcouncil on Public Infrastructure was convened by the Competitiveness Policy Council to produce recommendations for enhancing US international competitiveness by improving the effectiveness and efficiency with which we move people, goods, and information. Each innovation and advancement in transportation and communications infrastructure in this country — from the colonial King's Highway to the Wilderness Trail, from the building of the railroads to rural electrification, to the spread of the telephone and construction of the interstate highways system — has brought prosperity and progress. America thrives on efficient movement, and stagnates without it.

Nevertheless, by all measures, a massive under-investment in US infrastructure has occurred in recent years. Government investment in core infrastructure (including highways, bridges, airports, water and sewers) has been cut from 2 percent of gross domestic product (GDP) in 1959 to just 1 percent — a level that is one-quarter of the percentage in Germany.[1] The value of the nation's stock of public capital has fallen from 49 percent of GNP in 1970 to 41 percent in 1990.[2] From 1980 to 1990, federal spending on infrastructure fell from 4.7 percent of all federal outlays to 2.5 percent.[3]

While there is no absolute "right amount" that a nation should invest in infrastructure, the past decade of continuing and cumulative shortfalls in US infrastructure investment must be corrected, beginning now. A failure to act in the short term will continue to have long-term repercussions.

Infrastructure and Competitiveness

Since the work of David Aschauer was published in 1989,[4] public capital and its effect on economic growth and productivity have received considerable attention by economists. A number of studies have shown that the impact of public capital on private sector output and productivity is positive and statistically significant.[5] Although consensus on the precise magnitude of the effect must await further studies, what *is* clear is that infrastructure investment and economic growth are intertwined.

It is also clear that well-selected public investments in infrastructure can play an important role in furthering economic growth. A widely reported study by the Congressional Budget Office of cost-benefit studies of individual transportation projects found that investments to maintain the current quality of the highway system provided expected annual returns of 30 to 40 percent; selective expansion of the system in congested areas yielded returns of 10 to 20 percent.[6]

Beyond the economists, the nation demands improvements in our infrastructure. Americans daily confront the effects of infrastructure decline: congested highways, broken water mains, air traffic delays, reduced bus and rail service. Infrastructure investment sends the strong and unmistakable signal to the nation's citizenry that the government intends to invest in the future, that cities will not be abandoned, and that rural communities will have access to the nation's economic system.

Well-targeted investment in infrastructure can develop US industries into world-class leaders in their fields. Infrastructure investments in transportation, environment, and telecommunications technologies create market opportunities for American industries that are on the cutting edge of international competition. And productive infrastructure investment can create permanent new jobs in the economy, not only in construction but in upstream manufacturing as well.[7]

Our international competitors are not debating the role of infrastructure in their own competitiveness strategies. The Japanese and Germans are investing heavily to build state-of-the-art infrastructure. They are rolling up their sleeves and getting to work. So should we.

Short-Term vs. Long-Term Investment

Infrastructure investment must not be held hostage to the debate over whether deficit reduction or economic stimulus should come first on the nation's economics agenda. The "either/or" choice is not necessarily an appropriate framework. For too long we have ignored the economic impacts of deferred infrastructure investments or made them with no strategic plan in mind. As is true in infrastructure, in education, in training, and other areas, competitiveness is the result of strategic investments which combine to ensure our future security and prosperity. But such investments are necessary *now*. The recommendations offered here give policy makers a clear way of seeing infrastructure as a long-term competitiveness issue, happily with short term results.

The Subcouncil believes that the main reason there is any debate at all over whether, and how much, investment in infrastructure contributes to a nation's productivity, is the way in which infrastructure projects are funded and allocated. Put bluntly, infrastructure decisions too often begin and end at the bottom of the pork barrel. Both our citizens and policy makers are cynical of the process. Critical needs go unmet for too long, while scarce funds are spent unproductively. We get serious about infrastructure only when there is an apparent need for countercyclical measures or at election time when legislators feel a need to show tangible evidence of their success.

Infrastructure investment is essential for sustaining long-term national competitiveness. The new President should make it a top priority to explain this fact to the American people. He should explain exactly where the money will come from, and where every penny the people contribute will be spent. And he should explain that, while infrastructure development is a powerful short-term stimulus, the development of a long-term, well-funded infrastructure program will help ensure the prosperity of the people and that of their children well into the next century.

The Subcouncil has focused its attention on three areas of infrastructure that can make a difference in US global competitiveness:

- maintaining and improving our existing national transportation system;
- ensuring that financing for infrastructure investment is adequate and sustained over time; and
- seizing the historic opportunity to advance new telecommunications infrastructure for the 21st century.

II. Maintaining and Improving Our Existing National Transportation System

Transportation, when it works right, is the lifeblood of the American economy. When it does not, it is a stranglehold on our future. For a strong economy, efficient and effective transportation is not an option; it cannot be deferred indefinitely until tomorrow; it is an immediate and ongoing necessity. Congestion, deterioration, missing links, and obsolescence are real, costly impediments to productivity and trade competitiveness.

Congress made significant changes in the federal-aid transportation program when it passed the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The Act provides a framework for further legislation in 1993 that could be a first step in making the US more internationally competitive well into the 21st century. Indeed, the stated goals of ISTEA are worth reiterating:

> "It is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner."

Over the last decade, numerous studies have been done on transportation and other types of infrastructure.[8] This report builds on their foundation and updates their assessments. Important changes may also be called for in a number of transportation areas (rail, trucking, waterways) that were not given substantial attention in this report; the Subcouncil focused deliberately only on its highest priority recommendations.

Strategic Perspective

All levels of government must approach the national transportation system from a strategic perspective. That strategy must encompass an intermodal focus, an emphasis on efficiency, an understanding of the national interest, an accommodation of transportation and environmental interests, and a commitment to ensure that the transportation system reinforces rather than diminishes the economic vitality of the places it serves. In all cases, our goal now must be the maintenance, upgrading, and efficient use of the surface, air, and water transportation systems that we have already created.

- *Intermodal.* Connections across modes of transport on air, land, and sea must be improved to provide a seamless network of transportation for people and freight. Improvements in existing facilities and new facility construction should be made keeping in mind the link between transportation and competitiveness.
- *Efficiency.* Getting the most for our tax dollars is a national priority. An overall goal is to create more incentives in the system to increase efficiency. Efficiency depends on a rational pricing system that sends appropriate signals to users, matching the fees paid for use of the system to the costs imposed by the user. To the extent feasible, transportation user fees should be higher at congested facilities, during peak use, and if the user places a disproportionate burden on the facility or environment.

▶ *Flexibility and the National Interest.* Flexibility in making decisions is one of the key principles advanced in ISTEA; monolithic, centralized approaches are a thing of the past. Nevertheless, the transportation system must meet national goals as well as local objectives. The federal government has a strong role to play as a reliable partner, as a leader in innovation, and in ensuring that the national interest is served in addition to state and local concerns.

▶ *Environment and Transportation.* Transportation goals and environmental concerns have come into conflict in recent years, both on the ground and in policy terms. Now for the first time, federal transportation and environmental legislation are linked together. States are receiving significant funding to help meet the goals of the Clean Air Act; at the same time, states that do not meet the specified total emissions limits are threatened with an automatic, non-discretionary shut-off of federal transportation funds. Transportation planners and citizens alike are coming to terms with the realization that adding more roads and capacity to the system is increasingly difficult on environmental grounds and increasingly inadequate as a solution to congestion. The nation must apply creative thinking to actually *solve* environmental problems related to transportation, through alternative fuels and vehicles, land use policies, and pricing mechanisms.

▶ *Places.* Economic productivity demands attention to places as well as to mobility. We cannot simply "keep moving," abandoning cities as we advance further into suburban sprawl. We cannot ignore rural populations and small communities whose economic resources are insufficient to meet nationally-mandated standards. Transportation is, and must be increasingly placed in the context of land use considerations. Any new infrastructure program must guard against creating more hollowed-out cities.

Surface Transportation

The nation's interstate system is virtually complete and an extensive infrastructure of roads, highways, and bridges is in place. Some additional roads will doubtless be needed in the future to service new suburbs and rapidly-growing regions and to provide necessary capacity extensions. However, environmental concerns, the cost of new rights-of-way, and land use considerations pose formidable obstacles to adding new roads. The bulk of America's road-building days are in the past. Attention must turn now towards an aggressive program to maintain and manage our existing system.

Our goals can be summed up briefly: We must stem the decline of the last decade by appropriate stewardship of our nation's transportation assets. We must extend the life of our existing roads while doubling the life expectancy of any new roads we build or rebuild. We must move forward rapidly with visible proof that America has begun to rebuild.

Congestion and Deterioration

Congestion and physical deterioration are the two central problems of our surface transportation infrastructure. The US Department of Transportation noted in its most recent report:

> "By all system performance measures of highway congestion and delay, performance is declining. Congestion now affects more areas, more often, for longer periods, and with more impacts on highway users and the economy than at any time in the Nation's history. . . Almost 70 percent of daily peak-hour travel on the urban Interstate System in 1989 occurred under congested or highly congested (near stop-and-go) conditions. This represents an increase of almost 30 percent since 1983."[9]

Highway congestion annually causes an estimated 8 billion hours of lost work and economic production and wastes over 3 billion gallons of gasoline.[10] One study estimated that congestion costs from delay, extra fuel consumption, and higher insurance premiums on major freeways and arterial roads in 39 large metropolitan areas totaled over $41 billion in 1987.[11] Current market costs of congestion (considering only productivity losses, excess fuel use, and insurance) are estimated at a minimum of $100 billion annually.[12]

Congestion is also associated with highway accidents. We must work to reduce substantially the huge costs of life, productivity, and property caused by some 15 million annual motor vehicle accidents.

The deterioration of road conditions appears to have stabilized in recent years although a large backlog of poor roads exists. The Department of Transportation (DOT) reports that over 50 percent of all roads were rated in "poor" or "low/fair" condition in 1989.[13] Congestion and deterioration are interlinked; roads deteriorate faster as the volume of traffic on them increases. Many roads today are being pushed beyond the capacity for which they were designed in terms of both the volume and technology of modern vehicles. Particular attention needs to be paid to bridges that are structurally deficient (i.e., they are unable to handle the normal vehicle loads or speeds). Since 1984 the number of structurally deficient bridges on arterials and collectors has increased by 25 percent; some 25,000 interstate bridges will reach the end of their design lives in the 1990s.

Before considering spending money on the problem, the necessary conditions must be in place to make that money worth spending. The following sections address three major issues: How can state maintenance of effort be assured? How can we get the most for our money in efficiency improvements? And how can we build public support for making hard choices and accepting changes in driving habits?

Sustaining State Maintenance

"Maintenance" needs for highways and bridges can be considered as falling on a spectrum. At one end is reconstruction, followed by other capital-intensive preservation activities known as "3R" — resurfacing, rehabilitating, and restoration. Then comes preventive maintenance, such as applying seal coats, which can slow the rate of deterioration of pavement and thereby extend its useful life. (In the past, preventive maintenance was entirely state-funded; it is now eligible for federal funding on the interstate system only.) Finally, there is routine maintenance, such as trash and snow collection. Some analysts believe that the large federal-share contribution for 3R maintenance serves as a disincentive for states to fund preventive maintenance because deteriorated systems ultimately are eligible for federal preservation treatments.[14]

As Edward Regan has noted, "By periodically scraping and painting our bridges we inexpensively maintain them; by letting them rust, we set the stage for expensive rehabilitation or replacement. . . publicity-conscious politicians (and TV crews) will always prefer the sight of the first subway car passing over a glamorously reopened New York City bridge to the sight of maintenance workers scraping its underside."[15]

Numerous options have been put forward for ensuring a sustained maintenance effort on the part of the states. The broadening of the types of preventive maintenance activities that ISTEA made eligible for federal funding should continue. Some have called for making federal aid to states contingent on state performance in meeting specified maintenance standards. One approach, where feasible, is to have infrastructure bonds or grants contain a "covenant" or contract that lays out a schedule of maintenance to keep facilities in working order. The contract could call for annual performance auditing by an outside firm. Linking funding to a public reporting requirement on the status of maintenance activities may also be a promising approach.[16]

Getting More for Our Money

How can we get more out of the money we are spending? Recent years have seen increased interest in European standards for road building. These standards call for thicker surfaces, foundation materials that drain better, and thicker foundations.[17] Such roads cost more to build but less to maintain, and in the long run they result in savings due to reduced maintenance and downtime. It is a wasteful practice to build roads to last only 20 years rather than the 40 or 50 year lifespan of European roads. Moreover, given the increase in traffic volume in recent years, the cost of disrupting normal service to perform maintenance activities is that much higher.

Technology to build longer-lasting roads in America should be tested and rapidly deployed. The Subcouncil strongly supports upgrading the standards of road building to make roads last substantially longer. DOT should require SHRP (Strategic Highway Research Program) standards of materials; remove rigid requirements for selecting low price bids without regard to quality; and encourage states to develop performance-driven specifications and use life-cycle costing.

Techniques that focus on the efficient use of our transportation system can also reduce congestion. Such techniques seek to decrease vehicle miles traveled per person rather than building new roads and capacity. Methods include establishing HOV (high-occupancy vehicle) lanes during commuting hours; reducing or eliminating auto and parking subsidies; offering more frequent "paratransit" service using minibuses, taxis, and vans to enhance the attractiveness of public transport; and implementing congestion pricing wherever feasible.

The Subcouncil encourages DOT to implement rapidly ISTEA's provisions requiring the development of management systems, particularly in the areas of congestion and intermodal connections. States also must be strongly encouraged to implement these methods aggressively, to the point where state performance in reducing congestion should be factored into state allocation formulas. States instituting congestion pricing, HOV lanes, and other techniques in large urban areas that result in reduced vehicle miles traveled per person would receive an incentive bonus.[18]

Public Education and Acceptance

Efforts to build public awareness, understanding, and support for transportation projects must be given greater attention and more serious thought by authorities at every level of government. The public must be educated about several hard truths, among them the following:

- Expenditures on preventive maintenance and better-quality roads represent a sound fiscal policy and promise long-term economic benefit.
- Reconstruction of roads, which may involve longer shut-downs and greater inconvenience than resurfacing, is often a cost-effective approach in the long run. This is particularly the case in urban areas where traffic control can approach 50 percent of capital costs.
- New capacity should be added to existing roads in the context of a well thought-out congestion management plan; simply adding new roads in the past has often been found to induce additional driving, leading to renewed congestion and wasted taxpayer dollars. States and localities should be strongly encouraged to use congestion pricing wherever feasible, and to devote the revenues from congestion pricing to improvements that benefit users.

Meeting the Shortfall

In addition to assuring state maintenance, efficient use of resources, and public acceptance, the Subcouncil believes there is a need to invest in improvements to combat congestion and deterioration on much of the nation's existing surface transportation system. The federal government's first priority should be the National Highway System (NHS), a system of some 155,000 miles of roads of national significance that will be designated under ISTEA over the next two years by the Department of Transportation. The NHS represents about 4 percent of total road mileage in the country but it carries approximately 75 percent of truck traffic and over 40 percent of all vehicle travel. It is important not to overstate the centrality of the NHS, since the strength of our transportation system lies in its widespread connectivity. Nevertheless, the National Highway System does form the logical basis for federal aid to roads.

How far do current funds go in meeting the needs for system maintenance? Under ISTEA, Congress authorized $20.9 billion for highways for FY 1993. However, only about $18 billion was appropriated for FY 1993, and effectively, only about $17 billion will be delivered to the states. For public transit, Congress appropriated $3.6 billion for FY 1993; the ISTEA authorized level is $5.2 billion. Even ISTEA's fully authorized levels of $155 billion over six years do not represent the entire price tag for the nation's transportation needs. However, as a first step, the Subcouncil believes it imperative that Congress fully fund ISTEA at its authorized levels.

The Department of Transportation's most recent needs assessment for highways and bridges indicates an enormous shortfall between current spending and transportation needs.[19] For all highways, roads, and bridges, DOT estimates that federal, state, and local governments would need to spend $45.7 billion[20] annually in capital investments just to maintain the conditions and performance of the system at 1989 levels. To actually improve the situation would require $74.9 billion annually for the next 20 years.[21] As a point of comparison, total capital expenditures in 1989 on all highways, roads, and bridges were about $33 billion by all units of government.

Focusing solely on National Highway System roads and bridges,[22] the outlook is much better. The total annual cost of maintaining conditions and performance of NHS highways and

Table 1
Recommended Investments in Highways and Bridges

Purpose	Annual Federal Investment
Improve capacity on National Highway System (NHS) bridges:	$2 billion annually[a]
Maintain conditions on other bridges:	$1 billion annually[b]
Eliminate about half the backlog of NHS pavement deterioration	$2 billion annually[c]
Improve performance on the NHS through necessary capacity expansions	$5 billion annually[d]

a. Calculated as follows: Cost of improving NHS bridges is estimated at $66.3 billion, annualized over 15 years (rather than DOT's 20 year period), to $4.4 billion. Subtracting the cost to maintain NHS bridges ($2.2 billion annually) yields $2.2 billion. An 80% federal share yields roughly $2 billion.

b. Federal share of the non-NHS portion of the $4.2 billion annual cost to maintain bridge conditions, less estimated current expenditures.

c. Calculated as follows: Cost of eliminating pavement backlog for NHS is estimated at $145.4 billion, annualized over 15 years to $9.7 billion, less annual costs of $5.3 billion to maintain 1989 conditions = $4.4 billion.

d. Calculated as follows: Cost to improve conditions and performance for NHS highways is estimated at $402.8 billion, annualized over 15 years to $26.8 billion, less annual costs of $13.8 billion to maintain 1989 levels = $13 billion. Conservatively, take 50% of this figure, and 80% for the federal share, yielding roughly $5 billion.

Source: Calculated from data in US Department of Transportation, *The Status of the Nation's Highways and Bridges: Conditions and Performance* (Washington, DC: US Government Printing Office, Sept. 1991).

bridges at 1989 levels is projected at about $16 billion annually. DOT estimates that total (federal and state) expenditures on the NHS in FY 1992 were $14.8 billion.[23] FY 1993 expenditures on the NHS are expected to be about $15 billion again (although it is not clear whether future years under ISTEA will maintain these levels). Thus, if ISTEA were funded at authorized levels, the $1 billion shortfall would likely disappear.

Our goal, however, must go beyond maintaining 1989 levels. If we are not satisfied with the current conditions of the system, we surely will be even less satisfied with maintaining unsatisfactory conditions indefinitely into the future. Additional improvements in the system that focus on bridge safety and capacity and needed capacity expansions to highways and roads are costed out in Table 1.

The Subcouncil believes that these figures make a case for a substantial additional investment of up to about $10 billion annually well into the future, over and above ISTEA authorization levels. Although these levels of investment are not attainable immediately, they represent a useful benchmark for National Highway System investments. They represent what is needed to keep US roads and bridges in good working order and to keep America moving, safely and reliably.

Over time, we will need to gradually, but steadily, shift a greater share of transportation investment into upgrading existing rail and transit facilities. The congestion on our highways will require these steps, as will the provisions of the Clean Air Act. For public transit, additional funding on the order of $1.5 to $2 billion annually above ISTEA authorizations is needed to upgrade systems and eliminate the backlog of deferred maintenance.[24]

The additional funding proposed should go towards formula programs to permit adequate investment in maintenance. Close to 80 percent of the current transit program is earmarked by Congress. The Subcouncil believes that less earmarking should be done, to give state and local transportation agencies the flexibility to create and implement a balanced surface transportation investment program. However, special provision may need to be made for New York City's transit system which alone accounts for over 60 percent of all rail transit trips and over 40 percent of transit passenger miles nationwide.

Better needs assessments conducted by DOT in the future will help refine these funding recommendations. DOT's 1993 Conditions and Performance Reports are expected to integrate transit assessments with the highway assessment figures. Since in some cases public transit could provide an alternative to highways for some transportation demand, the final figure for surface transportation should involve a funding mix between highways and transit that reflects a substantial degree of flexibility for local choice.

How soon could funds be put to use? Many states have projects that have already been planned and developed and that could begin within a short time frame. A variety of important transportation projects do not require long planning horizons. In addition to preservation-oriented investments in 3R activities, these include:

- safety improvements to achieve the goal of reducing fatalities to 1.0 per 100 million miles by 2000;
- reductions in urban congestion by wider application of existing traffic operation technologies;
- improved access, safety, and movement on the freeways by more widespread installation of electronic technologies already available; and
- accelerated programs of bus replacement.

Nevertheless, the best short-term plan is a concerted beginning on a long-term effort. That long-term effort should include only well-selected projects with high positive rates of return.

A survey conducted in December 1992 found that state transportation departments could let highway projects worth a total of $26.5 billion during FY 1993, or $8.5 billion over current appropriations.[25] However, a significant number of states would have difficulty making the required match if funds were made available in the middle of a state's budget cycle.[26] Sufficient lead time should be given to the states to obligate the necessary funds.

Aviation

Aviation is a core element of both the US and world economies. The US aviation system has consistently been the best in the world — and remains so today despite the recent financial losses suffered by US airlines.

A well-run aviation system is one that can meet the nation's goals of safety, convenience, and capacity. For that to happen, all components of the aviation system — including airplane manufacture, airlines, airports, air traffic control, national and international regulation of aviation, and inspections operations — must be in good working order. The Subcouncil's deliberations touched on a number of these components and their roles in a competitive aviation system:

▶ *Airports*: New airport construction has virtually come to a halt, but expansion of existing airports, funded by passenger facility charges, may be sufficient to handle most capacity increases expected once the current recession lifts. The greatest capacity constraint at the busiest airports is the number of available runways;[27] dual runways may be the answer. While some states are studying the idea, little support exists in the airline industry for "way-ports," airports located far from urban centers with ground links to cities. Feeder or reliever airports may require additional attention in the future, as will congestion in ground access to airports.

▶ *International regulation*: Under the current international regime developed in the 1940s, some 1,200 bilateral agreements govern international aviation. Liberalization and reform of the current regime are ultimate goals; reciprocity is an important component of current and future negotiations.

▶ *Inspections*: Foreign tourism to the United States is now our largest international services industry. However, international air travelers to the US face unnecessary and burdensome procedures rarely encountered elsewhere in the world. People and goods moving through our international aviation system confront two primary federal agencies, the Immigration and Naturalization Service and US Customs. Federal inspections should be made more efficient to reduce delays in processing international air passengers.

The Subcouncil focused most of its attention on the air traffic control (ATC) component of the aviation system.[28] There is an overwhelming consensus in the aviation community that the ATC system requires fundamental change if aviation's positive contribution to trade and tourism is to be sustained. The ATC system's capacity, level of modernization and cost have a direct effect on our competitive position.

The ATC system is operated through the Department of Transportation by the Federal Aviation Administration (FAA). This uniquely positions the federal government in a pivotal role in the daily operation of air commerce. In recent years, with the surge of aviation activity in the United States, the FAA has struggled, successfully, to keep up with necessary technological improvements in safety. The FAA has been less successful in handling increased system capacity. Airlines and their passengers have suffered growing delays. In 1990, DOT reported that 21 primary airports were experiencing more than 20,000 hours of annual flight delays at a yearly cost to airline and US businesses of at least $5 billion; this level of delay was expected to extend to 33 airports by 1997.[29] Congestion pricing is one mechanism that merits further attention as a means of reducing congestion and delays.[30]

However, the FAA's problems in managing air traffic go beyond pricing mechanisms. Despite its best efforts, the FAA's 1981 National Airspace System Plan to replace and upgrade the ATC system within 10 years at a cost of $12 billion has risen to more than $27 billion, with little likelihood of the new technologies being completely in place until well into the next century.

The FAA is subject to the same budgetary, personnel, procurement, and management procedures as any other federal government function. But the ATC system also operates in a rapidly-changing technological context. There is a serious question whether such a governmental system can be as responsive as it needs to be to serve efficiently the operations and growth of the overall aviation system. Three basic issues are cited as problems:

- *A lack of more direct FAA control of its funding*: Despite the existence of a dedicated trust fund, the FAA is whiplashed by the traditional authorization and appropriation process, the Gramm-Rudman-Hollings law, and apportionment by the Office of Management and Budget. Planning is driven by necessity to a short-range focus by concerns about sequester, a "pay-as-you-go" funding process, delays in approval of a budget, and the federal deficit.
- *Lack of flexibility regarding procurements*: Cumbersome acquisition and procurement system requirements mean that the FAA is by and large unable to bring on line needed innovations and technical enhancements in a timely manner. Years of delay are added to procurement processes, occasionally resulting in the delivery of already-obsolete equipment.
- *Lack of flexibility regarding human resource management*: It has taken the FAA a long time to recover from the 1981 strike by the Professional Air Traffic Controllers Organization and the firing of 11,400 air traffic controllers. Meanwhile the federal Civil Service system sets personnel and pay ceilings, restricts relocation and training funds, and presents problems with pay comparability, relocation allowances, and high-cost area pay differentials. Federal human resource management requirements hinder the FAA's ability to recruit, select, train, and retain the necessary highly qualified technicians and operational personnel. This is particularly a problem at the nation's busiest airports which tend to be in high cost-of-living areas. Any human resource changes that require long lead-times are automatically disadvantaged.

A number of models for reforming the FAA have been proposed at one time or another,[11] including: (a) leaving the FAA as is, but strengthening its capacity; (b) making the FAA an independent agency; (c) reassigning the ATC functions to a self-supporting government corporation; (d) privatizing the ATC function; and (e) converting the entire FAA into a self-supporting government corporation.

The Subcouncil believes strongly that the air traffic control system must be reformed. Several alternative models already exist which address issues related to strategic planning, funding, human resources management, and procurement. It is imperative that a process be launched to identify and adopt an appropriate organizational model. The process must closely involve the FAA and the model selected should be the one which best meets the following criteria:

- preserves and enhances safety;
- preserves and enhances system capacity, efficiency, and on-time performance;
- accelerates research, evaluation, procurement, and modernization efforts;
- provides for direct and predictable funding opportunities;
- encourages strategic planning within an overall integrative management structure; and
- facilitates the recruitment, retention, training, and geographic placement of appropriate numbers of highly qualified technicians, procurement specialists, and operational experts.

Trade-Related Infrastructure

All aspects of the nation's transportation system affect our ability to engage effectively in international trade, as well as to move goods and services efficiently within the US economy. Fast, reliable, and inexpensive transportation reduces costs and delays, and can provide a competitive edge. For transportation to meet the goals of competitiveness, not only must each mode of transport work well, but the different modes must be connected in such a way as to provide a seamless network of working parts.

At the present time, major gaps exist in the physical linkages across modes of transport as well as in basic infrastructure related to trade and commerce:

- *Road/rail links:* Problems include congestion, lack of adequate maintenance, bridge and ramp design problems, lack of adequate rail gateways, gaps in rail and highway links to seaports and airports, and inadequate rail routes to serve US/Mexico/Canada trade.
- *Ports:* Full participation in international commerce requires expensive harbor dredging of channels and berths to expand our major ports in order to accommodate large and efficient ocean vessels.[32] On the land side, doublestack access to ports is often constrained by clearance obstacles along key rail routes; congested roads and inadequate rail linkages to marine terminals cause delays and raise costs.[33]
- *Airports:* Congestion is a problem, particularly in terms of ground access to airports, in over half of the major airports.

Congress recognized the need for "intermodal" efficiencies in naming its 1991 legislation the Intermodal Surface Transportation Efficiency Act. The law directs the Department of Transportation to promote intermodal planning at the federal and state levels, and includes intermodal connectivity as one of the required considerations of metropolitan planning organizations. Nevertheless, much remains to be done. US transportation policy, data collection, and management remain strongly biased to single mode consideration. Very little has been accomplished at DOT in changing that orientation.

DOT must move quickly to develop and adopt an intermodal strategy that will strengthen the points of connection across existing transportation facilities. The strategy should:

- identify existing and future trade flow and travel patterns and corridors for major trade sectors of the economy;
- inventory the key intermodal linkages across the United States associated with international trade;
- involve state and local officials, and transportation and manufacturing industry representatives in developing a plan and priorities for addressing gaps and constraints;
- designate ports of national and regional significance and establish revolving funds for capital improvements and capacity increases sufficient to handle a significant increase in exports;
- offer investment incentives and special low interest loans to speed private railroad investment targeted to US segments of major international north-south trade corridors;
- address the linkages between single occupancy vehicles and public transport; and
- examine the adequacy of plans for airport access improvements and capacity increases.

The strategy should identify specific infrastructure improvements to both intermodal nodes (such as ports and airports) and access links (such as highways and railways), and their cost.[34] Pending DOT's work in this area, this report uses an AASHTO estimate that approximately $1 billion should be budgeted annually to meet intermodal needs.[35]

An intermodal strategy must be supported by better information than is currently available. The Department of Transportation should move quickly to get the Bureau of Transportation Statistics called for in ISTEA up and running. The Bureau should collect and compile comprehensive data on the nation's transportation needs and develop useful measures of conditions and performance across transportation modes. The Bureau should also seek the active involvement of the transportation and trade communities that want and need data for their trade decisions.

The Bureau's data will build the empirical foundation for serious attention to issues of transportation and competitiveness. For example, analysis of investment choices and returns on investment continues to need refinement. The Bureau should also attempt to compare the productivity of the US transportation system with that of other countries.

Transportation Technologies

Emerging transportation technologies hold exciting potential for solving current transportation problems and opening new doors to efficient transport. Information-based technologies range from full deployment of existing traffic signalization systems to telecommuting, to intelligent vehicle and highway systems (IVHS), to the use of artificial intelligence and geographic and engineering software to evaluate capital investments and assess system conditions.

Other advances in transportation technology are most prominent in forms of high speed ground transportation, particularly high speed steel rail and magnetic levitation trains. The nation should continue to move forward with planned rail electrification projects and well-targeted high-speed rail projects. The latter should be targeted to interurban corridors of 100-500 miles experiencing significant congestion. Continued funding of R&D for maglev also appears to be a prudent and worthwhile investment to ensure a US competitive position in a potentially important technology for the 21st century.

The Subcouncil endorses the support for transportation R&D contained in ISTEA and recommends, for the present time, full funding at least at authorized levels. The active collaboration of the national laboratories and Army Corps of Engineers laboratory resources should be sought in an effort to move transportation technologies to the development and deployment stages. The federal government has a key role to play in developing and disseminating transportation technologies, and particularly in helping states and local governments to implement technological advances. Available, off-the-shelf technologies such as ramp metering and traffic signalization are still not adequately deployed.

Innovative federal technical assistance to states and localities to adapt and deploy such technologies is needed. For example, individual cities may hesitate to procure advanced technologies from new and innovative companies because of concern about servicing over the long term. If DOT were to offer long-term contracts, the system could benefit from economies of scale unavailable to individual cities. Another model is an innovative challenge program run by the US Environmental Protection Agency. In this program, EPA induced utility companies to chip in $30 million for a winning refrigerator design that meets specified energy efficiency and performance standards. In a similar manner, DOT could challenge states and the transportation industry on technology projects.

Another approach that could accelerate the development and deployment of new technologies is to create regional technology councils in each of the 10 federal regions, under the coordination of the National Academy of Sciences.[36] The regional councils would concentrate on such technologies as IVHS, alternative fuels, electric vehicles, and high speed rail. Their focus would be on adapting and deploying new technologies to meet the specific needs of their region. The councils would be encouraged to make use of existing laboratories and institutions in their regions and to build consortia for larger-scale efforts. An important function of such councils would be to stimulate federal/local, consumer/producer, and other forms of structured interaction to acquaint metropolitan planning organizations and states with technology choices, and to inform technologists about the specifics of local demands and needs. A pilot project in one or more regions would provide valuable feedback on the usefulness of regional councils.

Reorganizations

Two key problems with transportation at the present time have organizational sources or solutions. First, Congressional oversight is fragmented across multiple committees with jurisdiction over transportation matters.

ISTEA's omission of rail freight illustrates how transportation committee jurisdiction and organization are as modally balkanized as DOT's. More fundamentally, major transportation laws tend to focus on the requirements of a particular mode of transport rather than on the movement of passengers and freight as the *raison d'etre* of facilities and carriers.

In the Senate, three committees have jurisdiction over transportation: Commerce, Science and Transportation covers aviation railroads, and maritime matters; Banking, Housing & Urban Affairs covers public transit policy; and Environment & Public Works covers highways, waterways, and general public works policy. In the House, three or four committees are similarly involved: Energy & Commerce deals with railroads; Merchant Marine & Fisheries covers maritime issues; Public Works & Transportation deals with aviation, public transit, highways, waterways, and general public works; and Science, Space, & Technology has a role in transportation technology research. The Subcouncil recommends the reorganization of transportation and public works functions under single Congressional committees to promote systematic consideration of intermodal issues and national competitiveness concerns in transportation infrastructure.

The second issue relates to the public's perception of investment in transportation projects. One of the great challenges to a rational, well-thought out public infrastructure system in the future is the conflict in the public's mind between the concept of infrastructure as a productive economic investment and the all-too-familiar "pork barrel" projects. Despite the efforts in ISTEA to call for more rigorous planning, $6 billion was authorized for demonstration projects. Additional demonstration projects were included in the most recent transportation appropriations legislation even though the mainstream ISTEA federal-aid highway programs were appropriated at only 80 percent of authorized levels.

These projects, while often worthy in themselves, have an ultimately counterproductive effect on the infrastructure system, doing nothing to dispel the public's sense of wasted money. Without addressing this directly, and reining in the tendency to use transportation funds as pork, public confidence in the legitimacy of the system will remain low. The Subcouncil recommends creation of a bipartisan Infrastructure Commission to evaluate proposals for earmarking federal funds for demonstration projects, modeled after the Defense Base Closure and Realignment Commission. The Commission would present Congress with its list of nationally meritorious projects; the goal would be to limit federal demonstration project support to those with genuine national demonstration effect, such as pilot programs for new transportation related technologies.[57]

III. Financing

Infrastructure problems cannot be solved through a one-time infusion of funds. The deficit in spending on vitally needed public works stems from years of underfunding. It cannot be corrected with a short-term fix. The Subcouncil strongly believes that consistent, stable funding is absolutely necessary for a productive infrastructure sector. Two recommendations in infrastructure financing are offered in this section: first, to ensure the adequacy of funds for infrastructure investment, and second, to ensure that investments are appropriately and reliably financed.

Adequate and Sustained Financing

The Subcouncil believes that a package of infrastructure investment should contain its own financing proposals.[38] Various options for financing infrastructure investments were considered, including raising taxes, deficit financing, and reducing services elsewhere. Despite the unpopularity of raising taxes, the Subcouncil believes there is a growing understanding on the part of the public that our infrastructure is in need of investment and that in the face of the current deficit, taxes must be raised to cover the necessary costs. The Subcouncil recommends using an energy (carbon) tax or raising the gasoline tax to levels necessary to meet transportation and other infrastructure needs.

A broad-based energy or carbon tax (sometimes called an air pollution tax) has certain advantages over a gasoline tax, such as allowing clear linkages to be drawn between the use of fossil fuel energy sources and pollution.[39] On the other hand, a gasoline tax has several compelling advantages: it is well-understood, relatively easier to implement, and it has established revenue collection and management mechanisms.

Each penny per gallon of a gasoline tax is estimated to result in about $1 billion in revenues, with revenues decreasing as the tax increases (the precise elasticity is open to debate). The amount of taxes to be raised should be based on a more detailed needs assessment.[40] This effort has identified approximately $12.5 billion in additional annual investments above ISTEA authorized levels. (see Table 2).

As an example of what might be done, therefore, the current 2.5 cents of the gas tax that is used for deficit reduction could be reapplied to infrastructure and extended into the future, and the federal gas tax itself raised another 10 cents and earmarked for infrastructure. That would supply funding for the top-priority transportation investments called for by the Subcouncil.

It should be stressed that this is not the sum total of the nation's needs for transportation, let alone other types of infrastructure; it merely indicates areas of priority. Other funding requirements may include other types of transportation infrastructure; environmental water and wastewater facilities;[41] new infrastructure along the US/Mexico border; and public facilities, including schools and universities, and federal buildings (particularly for energy efficiency measures). As new transportation technologies move into the implementation stage, we must have sufficient funds available, as well as funding mechanisms, to move forward rapidly. This is particularly true for technologies such as IVHS and high speed ground transportation that may ultimately involve large-

Table 2
Increased Infrastructure Investments

	Annual Increase in Investment Above ISTEA Authorizations
National Highway System (highways and bridges)	$ 9 billion
Other Bridges	$ 1 billion
Intermodal	$ 1 billion
Public Transit	$ 1.5 billion
Total	**$12.5 billion**

scale deployment. Further funding might be reserved for human capital investments in education and training, for community development banks and enterprise zones, or other items. Some Subcouncil members have suggested more ambitious public capital investments at the level of $50 billion annually over the next ten years, over and above current investment levels.[42]

Federal Financing Mechanisms

Financial mechanisms for infrastructure investment are needed that will: (a) take capital outlays for infrastructure out of the federal operating budget; (b) facilitate rapid and flexible funding of infrastructure projects; (c) strengthen the selection process of infrastructure investment to work against "pork barrel" tendencies; and (d) ensure the reliability and availability of revenues committed to infrastructure purposes.

The Subcouncil actively considered a number of mechanisms for meeting these goals, and focused primarily on two: a capital budget and a National Infrastructure Bank. These two mechanisms could be considered as either complementary or alternative approaches, depending on the scope and timing of their implementation.

Capital Budget

Capital budgets are maintained by many other countries as well as by state governments in the US. The US federal government, however, lumps capital expenditures in with operating expenses in the annual budget. The Subcouncil strongly believes that capital investments should be accounted for and financed on a long-term basis. This makes intuitive sense since by definition, capital projects are designed to yield benefits over a period of time. Accounting for the entire capital investment in one year in the same manner as operating expenses skews the decision-making process away from appropriate long-term decisions.

A capital budget for the US would include an inventory assessment, estimates of capital requirements, estimates of operations and maintenance, sources of financing, and allocation of responsibility. Accounting definitions and procedures should be consistent with generally accepted accounting procedures. Any special issues unique to the federal government should be resolved in a manner acceptable to the Federal Accounting Standards Board. Depreciation and other capital consumption costs should be included as expenses in the operating account. This effort should build on recent work by the Commerce Department in collecting data on capital assets.

The Subcouncil does not minimize the work involved in developing a capital budget nor the temptations of various interests to define many different types of public spending as capital investment. However, budgetary safeguards can be devised to prevent abuse of the system and technical difficulties can be overcome. While not a panacea for infrastructure problems, the Subcouncil fully supports the implementation of a capital budget for the United States.

National Infrastructure Bank

Creation of a new national bank has been proposed as another type of financial mechanism that would accomplish many of the desired purposes. First and foremost, the Bank would be the repository and manager of federal infrastructure trust funds, thus removing the political pressures to use trust fund monies to mask the federal deficit. The Bank would be a public institution, established by Congress, to which it would report annually.

Thinking more broadly, the Bank could take on additional roles. For example, the Bank could be charged with evaluating and funding transportation demonstration projects; it could operate as, or in conjunction with, the Infrastructure Commission proposed above. The Bank could play a key role on projects of national significance, such as large-scale transportation projects, new technologies, infrastructure in low-income and rural areas, or trade-related infrastructure that do not currently receive adequate attention because their costs fall outside the scope of the yearly, short-term budget cycle.

The Bank would be able to offer federal agencies market and risk criteria to help evaluate infrastructure projects. The Bank would also issue infrastructure securities, providing a market-determined, taxable rate of return, to be sold on the open market. These bonds would be backed by dedicated revenues from a new gas tax. The federal government would make a permanent commitment to provide this stream of dedicated revenues to support the Bank's ability to raise the necessary capital to finance the investments. Clear lines of responsibility and authority would need to be spelled out to ensure that the Bank functions primarily as a financial mechanism rather than duplicating the policy-making roles of Congress and the federal agencies.

The advantage of a National Infrastructure Bank would lie in its ability to leverage the revenue stream to raise large amounts of capital when needed for major projects. Thus, for example, if a gas tax increase were phased in with small annual increments, the Bank could issue bonds to raise the required amounts of money in early years, to be paid off in later years with revenues from the gas tax increase. The market for the Bank's bonds would be both institutions and large private investors, with an attempt made to attract private and public pension funds (currently worth about $2.6 trillion). Under properly-controlled circumstances, the Bank could be authorized to finance additional infrastructure spending as a countercyclical measure during a recession, waive the state and local match requirements during such a period, and undertake other types of financing arrangements to attract private capital to invest in state and local infrastructure projects.

Other financial mechanisms have been put forward as well by individuals and organizations studying the issue of infrastructure investment. For example:

- ▶ A *capital investment block grant*, administered by the US Treasury, could be issued to states annually for expansion and modernization of capital facilities. Grants would be allocated according to a redistributive formula, favoring communities and regions with the greatest capital deficiencies and economic needs. Oversight committees in each state would report annually on the use of the funds and the state's maintenance of effort.
- ▶ A *National Infrastructure Corporation* was proposed by Senator Moynihan in 1991. The Corporation would serve as a regionally-based federal revolving loan fund, making loans (at a 50/50 federal/state match) to state revolving funds for innovative infrastructure projects with revenue-generating potential.[41]

One group studying the issue at present is the Infrastructure Investment Commission, which was established by ISTEA to conduct a study on the feasibility and desirability of creating a type of security that would permit the investment of public and private pension funds in infrastructure. The Commission's interim report recommends the creation of a national infrastructure corporation capitalized by an increment of the gasoline tax, direct appropriations, or existing government agency funds.[44]

The corporation would serve as a domestic version of the Overseas Private Investment Corporation, functioning in several ways: (a) by providing direct insurance and reinsurance to issuers of bonds for infrastructure projects; (b) by making loans to priority projects that have credit-worthy revenue projections but lack historical operating results; (c) by helping to capitalize state infrastructure revolving funds; and (d) by issuing new infrastructure securities that would offer pension funds a competitive, taxable, market rate of return.

IV. Telecommunications for the Future

The global information infrastructure is in a period of dynamic change and extraordinary opportunity. Driving this change is the enormous energy unleashed by the confluence of advanced telecommunications technology and the computer revolution.

New telecommunications technologies, such as fiber optics or satellites, can transmit immense quantities of data over long distances.[45] Using sophisticated software programs, constantly developing electronic switches, and advances in opto-electronic devices, these networks can manage an increasingly high speed traffic flow among large numbers of users. The computer revolution has brought to every desktop the ability to reduce all kinds of information to digital form (i.e., electronic and photonic bits), and to organize and manipulate such data at great speed and in vast quantity.

In the intelligent networks of the future, home or office computers will give consumers the tools to exercise great control in the selection of services. Moreover, advances in wire technology (fiber optics, copper compression) are being accompanied by advances in wireless technologies (including cellular phone service and, now, personal communication services or PCS) which permit transmission and receipt of information by portable and mobile sources. Wireless is soon likely to be an efficient means for the business or personal transmission of data, as well as voice.

These — and yet undreamed of — innovations will permit us to communicate more rapidly and cheaply than has ever been contemplated. Electronic and opto-electronic networks and equipment will transform how we learn, think, and operate in our environments, and will add a new component to the infrastructure of the 21st century. While ribbons of asphalt and concrete created today's highways, the superhighways of the future will be interconnected webs of wired and wireless telecommunications networks, with potentially infinite entry and exit ramps.

Indeed, communication "superhighways" could be as important for the nation's productivity, competitiveness, and individual empowerment as was the building of the interstate highway system in the US earlier this century. According to a study by the Economic Strategy Institute, the continuation of current trends in broadband investment should produce a gain of nearly $200 billion in US output over the next 16 years.[46] Impressive results in education, training, transportation, health care, and manufacturing from a broadband network are already being found in pilot projects.[47]

The new 21st century technologies are emerging from a 20th century scheme of regulation created for a world in which different rules governed the transmission of information by the phone company, TV broadcasters, the cable TV operator, and the newspaper. Today, all of these companies embrace the new digital and transmission technologies, and all seek to bring new uses and services to new markets. Joint ventures are announced daily by firms that simultaneously compete fiercely in other areas.

The federal government's role in this area is different from traditional transportation infrastructure.[48] The government is not being asked, nor should it offer, to pay for new telecommunications infrastructure. Nor does government support for particular technologies necessarily lead to the desired results in this fast-moving competitive environment. Rather, the federal government has two responsibilities: first, to speak with a unified, clear voice, and second, to define the new "rules of the game" as swiftly and soundly as possible.

The primary need is for a single, authoritative federal policy-maker on telecommunications, rather than the current melange that includes the Federal Communications Commission (FCC), the National Telecommunications Information Administration (NTIA), the Defense Department, Judge Harold Greene, and Congress. New legislation replacing the 1934 Communications Act will be needed to effect this change.

The second requirement is for the government to move swiftly to define a coherent regulatory framework for telecommunications that will end the current gridlock, promote equitable treatment of companies, and safeguard the public's access to reasonably-priced telecommunications services. This will enable decision-makers, from the apartment dweller to the multinational corporation, to make choices among technologies and services with confidence. It will also allow American manufacturers to move rapidly in domestic and international communications markets. While encouraging private sector initiative, federal policy should also take steps to avoid creating a new class of the "information poor" to the detriment of our ability to field the educated and healthy workforce needed to compete in tomorrow's marketplace.

The US currently represents about half of the estimated $1 trillion dollar world market for telecommunication equipment and services. Japanese and European firms have a considerable presence in this market[49] with strong government involvement in telecommunications; some countries have committed to the accelerated deployment of integrated broadband networks. Competitive advantages are likely to accrue to countries that deploy new network technologies first.[50]

Decisive action by US policy-makers will be critical if we hope to take advantage of American technical know-how in key areas:

▶ Once given up for dead, the American HDTV program has, under an FCC-led cooperative process with industry, leapfrogged the Japanese and European competition. With the FCC setting the goal and criteria for standards, the rapidly-developed American digital technology has become the target for the rest of the world to meet.

▶ Newspapers contain daily announcements of developments in domestic and international PCS technology.[51] If we are to compete in this market, government must make it possible for equipment and service providers to build a domestic PCS base. To do that the FCC must allocate spectrum (without injuring incumbent microwave licensees) and establish an appropriate licensing and regulatory framework for these new services.

▶ Although the US has traditionally held a strong position in fiber optics because the technology was invented here, other countries, particularly Japan, are making strong advances and may surpass US progress. Japan's industrial plan calls for universal fiber optic deployment by 2015.

With major policies — such as spectrum allocation, approval of PCS licenses, selecting an HDTV standard — on the verge of resolution, it is crucial that we avoid a leadership vacuum.[52]

Following a decade in which court decisions have tested the boundaries of state and federal authority, the FCC and state regulators have created a forum which holds promise for addressing common issues. States function as very important laboratories to deploy, develop, and utilize new telecommunications technologies.[53] The Subcouncil strongly urges federal and state governments to continue to work in coordination to ensure that their policies are in sync.[54] This type of forum should proceed under the new Administration to shape substantive issues of network policy.

In addition to setting the rules, government is obliged to put to full advantage its own programs that bear a critical relation to the development of the telecommunications infrastructure. It must use its R&D programs as testbeds for network developments, and conduct telecommunications procurement with a view towards broader infrastructure implications. It must also provide a database policy and rules to govern the vast quantities of electronic information which governments produce or sponsor. Further details on these recommendations are provided in the remainder of this section.

Finally, the Subcouncil takes note of the strong interest and leadership role in telecommunications policy on the part of Vice President Gore, and is encouraged that federal policymaking will move forward in 1993. In view of the urgency of action in this area and the complexity of the subject, the Competitiveness Policy Council should convene a new Subcouncil that will take a closer and more detailed examination of telecommunications issues in 1993.

Defining the Rules of Telecommunications Networks

Competing telecommunications companies currently offer a profusion of technologies and services, and operate under a patchwork quilt of obligations and regulations. Large business is discovering the cost savings and productivity gains available from tapping into networks. Corporations with the money and expertise needed to navigate the telecommunications jungle are daily adding to the thousands of private telecommunications networks in the United States. There is intense competition among the current players of the telecommunications/information industry — telephone and cable companies, newspaper publishers, and electronic information providers — to set the rules of the game in their favor.

No single set of rules will eliminate efforts to "game the system" on behalf of particular technologies or industry groups; however, fair and predictable rules *can* be developed. This Subcouncil did not attempt to do more than outline the areas in which ground rules are particularly needed. Rules must address:

▶ *The redefinition of universal service and who will pay for it.* By the later part of this century, the goal of basic telephone service on a universal basis had been substantially achieved. Now, with new technologies available, the old concept of universal service is being redefined again, and new ways to pay for universal service must be considered. Should every home be wired with the latest technology — fiber optics, for example? (See box.) Will information directories, news and public service announcements, classified ads, and interactive medical and educational services be considered essential services that must be included in the universal service commitment?

▶ *Common carrier obligations of communications companies.*[55] Recent technical and legal changes[56] have spurred an exploding industry of companies that provide services that once were the preserve of the telephone company. Newly created competitors can buy components of service from the Bell companies, and match them with components produced more economically by themselves or others. The new competitors, by and large, are not subject to traditional obligations. The ability to construct networks is now within the purview of private organizations that are not even primarily in the communications business (such as universities or banks). Government must decide whether all providers of network service should be subject to similar obligations.

▶ *First Amendment issues.* The recent Presidential campaign demonstrated that the town halls in which political decisions will be informed and debated are increasingly electronic. Government will need to define the obligations of telecommunications networks to provide right of access and to respect First Amendment rights.

▶ *Public information services.* Government has traditionally taken on the obligation of creating information or providing access to information where the market would otherwise fail to do so. Examples include public

The Fiber Optics Debate

The Communications Competitiveness and Infrastructure Modernization Act introduced in 1991 by Senator Burns (S.1200) proposed that the universal service provision of the 1934 Communications Act be amended to provide for access to "a nationwide, advanced, interactive, interoperable, broadband communications system available to all people, businesses, services, organizations, and households...."

There is substantial agreement that presently available fiber optics technology will remain a technology of choice for decades into the future. Fiber optics is already widely deployed throughout the telephone system, and will be extended as existing copper transmission lines require replacement. However, there is debate about the need to provide financial incentives to spur further private development of the network, either "to the curb" or "to the home." Estimates of the cost of fiber optic deployment have ranged into the hundreds of billions of dollars, but a recent study by Corning estimates that accelerated broadband fiber deployment could be achieved by 2015 based on the regular annual $20 billion investment levels of the telephone companies and an additional infusion of about $1 billion annually. If these numbers are accurate, the issue of direct federal investment could well be moot.

Part of the debate is the extent to which fiber capabilities add value to residential customers already served by telephone and cable systems, particularly in light of lower cost and continually developing bridge technologies (e.g., narrow band integrated digital network service and copper wire compression methods). There is also a market issue: will people be willing to pay for fiber optics technology that might yield products and services that are not yet entirely foreseeable? The response from the other side is a paraphrase from the movie, *Field of Dreams:* "if you build it, they will come." New hardware will drive the development of applications, which will attract customers and spur new hardware, etc.

Proposals to accelerate the deployment of fiber optics, including the Burns-Gore bill, would provide the telephone companies with the incentive to invest by offering them the opportunity to enter into the cable programming business (from which they would otherwise be barred). Telephone companies would fund accelerated deployment by seeking accelerated depreciation of their existing technology from state utility commissions. Thus, accelerated deployment would not be a mandated requirement nor require federal outlays; instead it would involve incentives to private industry, with costs potentially assumed by ratepayers.

libraries, the Public Broadcasting System, and the National Endowment for the Arts. Government must determine what the electronic equivalent of a public library and other similar public information sources will be.

▶ *Privacy rights.* New technologies have far outpaced the privacy and security safeguards available. Government must set rules to assure that basic rights to privacy are not compromised.

▶ *Intellectual property.* The digitalization of information and explosion of new databases requires the development of: (a) copyright rules that are viable in a digital world; and (b) rules that harmonize with international standards for data transmission and ownership in light of the growing internationalization of data flows.

▶ *Technical standards.* The FCC must use mechanisms at its disposal to promote the development of standards by industry, with the aim of making technologies ubiquitous, interoperable, and transparent. Standards must also be flexible enough so that they do not stultify innovation.

Ultimately, the rules of the game will look quite different from today. For example, despite very real current obstacles, it is likely that eventually we will have a system in which no company is excluded from providing services in areas where its technologies and skills allow it to be successful ("you can't say you can't play"). Recent FCC rulings and legislative activity have gone in the direction of permitting greater competition, albeit with regulatory controls, in one of the most hotly-debated arenas in recent years — the terms on which the regional Bell telephone companies (RBOCs) should be permitted to enter the cable programming business, provide information and long distance services, and manufacture equipment.[57]

Providing the Models and Catalyst for Network Development

Federal and state governments are intimately involved in the funding of the communications infrastructure; their involvement provides models, and serves as catalysts, for network development. For example:

▶ *Network R&D.* The federal government has long been involved in funding research and development of computer technology. The High Performance Computing Act of 1991 calls for federal funding and oversight of NREN — the National Research and Education Network. The act calls for the creation by 1996 of a high speed data network (1 gigabyte per second) to link "research and educational institutions, government and industry in every state."

Concerns have been raised that NREN may evolve into the dominant national broadband network without assuming common carrier obligations. This might be mitigated by using NREN as a test bed to develop policies that:[58]

- encourage competition among private carriers in the development of network components;
- encourage innovation in information entrepreneurship through an open network architecture platform;[59]
- experiment with pricing policies needed to assure nondiscriminatory access by users of and suppliers to the network, and test ways of assuring the provision of public service information;
- develop protocols needed to develop privacy, security, and reliability standards; and
- determine the appropriate use of government networks, including NREN, for commercial use.

▶ *Government Procurement Policy.* Governments at all levels, including states and state universities, purchase some $32 billion of information technology resources annually.[60] Federal telecommunications procurement policy can drive market development. The Office of Federal Procurement Policy which coordinates federal procurement policy, should work with the National Telecommunications Information Administration (NTIA) to address the coordinated use of federal purchasing power to stimulate technologies and network innovation. An important aspect of the coordination effort should be linkage of telecommunications needs with the technical capabilities housed in government and contractor defense establishment. Defense conversion provides the opportunity to redirect extraordinary talent to telecommunications infrastructure. Faster commercialization of defense technologies in the telecommunications field could provide additional competitive advantages.

▶ *Federal Electronic Information Policy.* The federal government is a vast producer of, and warehouse for, information. This information is increasingly being produced and stored in electronic form. Federal policies can promote uniform interfaces that permit ease of access to this information. However, basic policy issues require resolution, such as the following:

- What are the government's obligations to disseminate data maintained electronically? How should data sold by the government be priced and packaged?

- How do the government's obligations change when a contractor is involved in collecting, packaging, or reselling the data?
- How can we make sure that businesses of all sizes have reasonable access to the myriad sources of data created and compiled by government?

▶ *Demonstrate Appropriate Technology.* The government should supplement the private sector in ensuring that network users have the information needed to match their needs with appropriate technologies. Ongoing experiments should be continued and extended in the use of new technologies in schools, hospitals, transportation, manufacturing, the electronic mapping of urban infrastructure, and other areas of the economy.

- Federal and state health, education, commerce and transportation agencies should disseminate "what works" information to their constituencies.
- Small and medium-sized businesses — which often identify communications as their foremost need for assistance — should be able to turn to the federal extension service for help in sorting through the maze of telecommunications options.
- In promoting appropriate technological alternatives, government should focus on the great potential for productivity gains from coordination among industry sectors. For example, electric and gas utilities are employing new information technologies to electronically map their systems.[61]
- NTIA should, in coordination with program specific agencies (such as the Departments of Education and Health and Human Services) determine where government funded demonstration projects may supplement gaps in ongoing experimentation.

Notes

1. Michael Montgomery and David Wyss, "The Impact of Infrastructure," *DRI/McGraw-Hill US Review*, October 1992.
2. Clifford Winston and Barry Bosworth, "Public Infrastructure," *Setting Domestic Priorities*, eds., Henry J. Aaron and Charles L. Schultze (Washington, DC: The Brookings Institution, 1992) p. 268.
3. US Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (Washington, DC: US Government Printing Office, 1991) Table 1.
4. Aschauer found that under-investment in infrastructure may be responsible for up to one half the decline in US productivity since 1970. David Alan Aschauer, *Public Investment and Private Sector Growth* (Washington, DC: Economic Policy Institute, 1990).
5. See Alicia H. Munnell, "Is There Too Little Public Capital?" in *Infrastructure and Economic Growth: Round Two, The Public's Capital* (Cambridge, MA: John F. Kennedy School of Government, Harvard University, Spring 1991). In the same issue of the publication, Charles R. Hulten and Robert M. Schwab argue that the effects of infrastructure on output have been overstated and that the data give different results according to the statistical method used ("Is America Really on the Road to Ruin?"). Some economists believe that the direction of effects is reversed; that higher investment in infrastructure occurs as a result of increased output. A useful review of the record and debate on infrastructure investment and economic growth is found in: US Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (Washington, DC: US Government Printing Office, July 1991).
6. US Congressional Budget Office, *New Directions for the Nation's Public Works* (Washington, DC: US Government Printing Office, September 1988).
7. One set of estimates indicates that each billion dollars of investment in highway and bridge maintenance could produce some 40,000 new jobs (25,000 direct, 15,000 indirect). [See: Montgomery, *op. cit.*] The Congressional Research Service recently estimated that new full-time jobs created per billion dollars of investment would range from 18,000 to 21,500 for construction of new transit and new roads, and for maintenance and repair construction. Congressional Research Service, *Job Creation Estimates* (Washington, DC: Congressional Research Service, 1992).
8. Alan Pisarski, "A Review of Contemporary Transportation Infrastructure," prepared for the Competitiveness Policy Council, July 23, 1992. Major documents from the last decade include: *America in Ruins* (1981), *Hard Choices* (1984), the National Council on Public Works Improvement's final report, *Fragile Foundations* (1988); US Congressional Budget Office, *New Directions for the Nation's Public Works* (1988); US Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (1991); US Congress, Office of Technology Assessment, *Delivering the Goods* (1991). More recently, the Nunn-Domenici "Strengthening of America Commission" called for increased total spending on highways, mass transit, and aviation, including innovative technologies, by $100 billion over a 10-year period. Funding for these fees would come from infrastructure taxes, energy taxes, and fees; tax-exempt infrastructure bonds would be issued by state and local governments. [*The Strengthening of America Commission*, First Report (Washington, DC: Center for Strategic and International Studies, 1992).] The Cuomo Commission on Competitiveness recently recommended an increase in physical infrastructure investment by $50 billion in 1993 and by $65 billion in 1994 and for the next nine years. See: Cuomo Commission on Competitiveness, *America's Agenda: Rebuilding Economic Strength* (New York: Simon & Schuster, 1992).
9. US Department of Transportation, *The Status of the Nation's Highways and Bridges: Conditions and Performance* (Washington, DC: US Government Printing Office, September 1991) p. 20.
10. James J. MacKenzie, Roger C. Dower, and Donald D.T. Chen, *The Going Rate: What It Really Costs to Drive* (Washington, DC: World Resources Institute, June 1992) pp. 17-18.
11. "Roadway Congestion in Major Urbanized Areas 1982-1987," Texas Transportation Institute in cooperation with the US Federal Highway Administration, 1989, as cited in MacKenzie et al, *op. cit.*
12. MacKenzie et al, *op. cit.*, p. 19. The estimate is based on sources cited by the US General Accounting Office in *Smart Highways: An Assessment of Their Potential to Improve Travel* (Washington, DC: US Government Printing Office, May 1991).
13. Pavement in poor condition typically requires reconstruction to restore serviceability. Pavements rated as "low fair" are at a point at which pavement management programs can prolong the life of the highway surface at less cost than reconstruction.
14. US General Accounting Office, *Transportation Infrastructure: Preserving the Nation's Investment in the Interstate Highway System* (Washington, DC: US Government Printing Office, August 1991) p. 23.
15. Edward V. Regan, "The Global Difference," *The World & I*, August 1991, p. 75.

16. It is also a useful feature of the National Infrastructure Bank proposed in Section III. The experience of New York City is instructive in this regard: a Charter Review Commission formed in 1988 required the mayor "to annually and publicly set forth maintenance schedules, estimate the cost of meeting them, and make the required appropriations for maintaining the city's major capital assets." Regan, *op. cit.*, p. 79.

17. Longer life is not simply the addition of pavement thickness. Thickness, however, relates to fatigue failure, and few pavements in this country fail in fatigue. Rather, for longer life, the entire pavement structure must be engineered. This means building a drainable foundation thick enough to avoid overstressing the subgrade, covered with appropriate asphalt. If designed and built properly, such a structure should last indefinitely, although the wearing surface would require periodic replacement as it absorbed the deterioration caused by loadings and climate.

18. The Senate version of ISTEA (S. 1204) included a provision that applied to states with metropolitan areas of 250,000 or more where significant cuts in growth of vehicle miles traveled (VMT) are possible. The provision would have added or reduced a state's metropolitan area funds by up to 10 percent if the state succeeded in reducing VMT per capita below 90 percent of 1990 levels or if VMT per capita exceeded 110 percent of 1990 levels, respectively.

19. US Federal Highway Administration, *The 1991 Status of the Nation's Highways and Bridges: Conditions, Performance, and Capital Investment Requirements*, Publication No. FHWA-PL-91-015 (Washington, DC: US Government Printing Office, November 1991). Questions have been raised about the data and assumptions used to compile DOT's needs assessments. The needs assessments for highways and bridges have improved markedly in recent years, although there are still concerns about the extent to which functional performance and economic considerations are factored into the estimates. In any case, no independent capabilities exist outside DOT for assessing the highway system. Perhaps the most appropriate use of these estimates is as benchmarks of the order of magnitude of need.

20. These and subsequent needs assessment estimates are reported in 1989 dollars.

21. Improving the situation would mean: eliminating the backlog of reconstruction on "poor" roads, preventing "low-fair" roads from deteriorating to the point where they need reconstruction, and making necessary capacity increases in light of projected population increases, taking into account aggressive congestion management programs that include ramp metering, traffic signalization, ridesharing, and channelization (but not congestion pricing).

22. An interim calculation was made for roads that are likely to be included in the National Highway System, as follows: 100% of urban and rural interstates and rural principal arterials; 90% of urban freeways and expressways, and 50% of other urban principal arterials. Harry Caldwell, Department of Transportation, personal communication, November 3, 1992.

23. This is made up of a 40% federal and 60% state share. Harry Caldwell, Department of Transportation, personal communication, November 16, 1992. Note that if a lesser amount of funding is actually devoted to the National Highway System than is estimated or expected by Department of Transportation, the investment levels recommended below would be considerably on the low side.

24. The Federal Transit Administration recently estimated that $7.5 billion in capital investment is needed annually over the next 10 years for bus, paratransit, and rail. US Department of Transportation, Federal Transit Administration, *Public Transportation in the United States: Performance and Condition*, Report to Congress (Washington, DC: US Government Printing Office, June 1992).

25. American Association of State Highway and Transportation Officials, *A Report on the Highway Program Capacity of State Highway and Transportation Departments, FFY 1993-1996* (Washington, DC: American Association of State Highway and Transportation Officials, December 7, 1992).

26. According to the American Association of State Highway and Transportation Officials survey, 34 of 50 states could make the required state match for FY 1993 even if an additional $10 billion were available from the federal government; the other 16 states would require a waiver for 50 to 100 percent of the federal funds.

27. US Congress, Office of Technology Assessment, *Delivering the Goods: Public Works Technologies, Management, and Finance* (Washington, DC: US Government Printing Office, April 1991) p. 82.

28. The ATC system consists of the control towers, air route and terminal traffic control facilities, and flight service stations, with their associated air traffic controllers and equipment.

29. US Department of Transportation, *Moving America: New Directions, New Opportunities* (Washington, DC: US Government Printing Office, February 1990) p. 24.

30. A recent study of this issue recommended that DOT encourage airports to experiment with congestion pricing and evaluate the effectiveness of alternative approaches. [National Research Council, Transportation Research Board, *Winds of Change: Domestic Air Transport Since Deregulation* (Washington, DC: National Research Council, 1991).] Congestion

pricing for use of ATC services at congested airports has also been proposed as a means of giving ATC users more rational price signals than the current airline ticket tax does; it would likely shift more general aviation away from congested airports, although it could raise safety concerns as well. Richard Golaszewski, personal communication, September 30, 1992.

31. For a detailed analysis of these models, see Herbert Jasper, "Organizational Options for the Federal Aviation Administration," Appendix B in *Winds of Change: Domestic Air Transport Since Deregulation, op. cit.*
32. Improving the ability of US ports to compete in world markets will require solving the environmental and cost problems associated with dredging. One important element is to streamline the federal permit process governing the disposal of dredged materials by developing a timely process for resolving disputes between the Army Corps of Engineers and the Environmental Protection Agency. Another avenue is to invest more federal funds for R&D of disposal technologies and soil remediation. Federal funds could be raised through imposition of a surcharge on vessels using our ports based on vessel draft requirements and tonnage handled.
33. A 1991 study by the Federal Maritime Administration and Transportation Research Board of 48 ports found that 64% had usually or always congested truck routes; 56% had numerous at-grade rail crossings; and 36% had inadequate clearance for doublestack container trains. National Research Council, Transportation Research Board, *Landside Access to US Ports, Phase I: General Cargo Ports* (Washington, DC: National Research Council, February 1992).
34. A Report to Congress from the Department of Transportation on the impact of trade flows on highway needs is due in June 1993.
35. As cited in American Association of State Highway and Transportation Officials, *Keeping America Moving: The Bottom Line* (Washington, DC: American Association of State Highway and Transportation Officials, 1988).
36. Tom Horan, Institute of Public Policy, George Mason University, personal communication, November 9, 1992.
37. Erwin von den Steinen, "Rebuilding the American Commonwealth: Ending the Gridlock in Transportation," *Progressive Policy Institute Policy Report* (Washington, DC: Progressive Policy Institute, May 1992). The concept of the Infrastructure Commission could mesh with the National Infrastructure Bank discussed in the next section.
38. One major reason for falling investment in infrastructure is the lack of revenues available to pay for it. A recent study noted that dedicated fuel taxes which finance highway construction are imposed on a cents-per-gallon basis and have not increased as fast as general inflation. When state and federal tax rates are considered together, the average current rate of 16 cents is much lower than the 1960 tax rate, equivalent in today's terms to 27 cents a gallon. Winston and Bosworth, *op. cit.*
39. Recent studies find that carbon taxes may be less burdensome on the poor and middle class than is commonly thought. However, coal-producing states or sectors are likely to offset the burdens of a carbon tax. See: Roger C. Dower and Mary Beth Zimmerman, *The Right Climate for Carbon Taxes: Creating Economic Incentives to Protect the Atmosphere* (Washington, DC: World Resources Institute, August 1992).
40. A recent GAO study concluded that the current revenue stream into the Highway Trust Fund will be insufficient to support full funding of ISTEA. US General Accounting Office, *Highway Trust Fund: Strategies for Safeguarding Highway Financing* (Washington, DC: US Government Printing Office, September 1992).
41. Even with aggressive water conservation and toxics reduction practices, up to an additional $5 billion above current federal funding levels may be needed for water and wastewater facilities. A 1990 study estimated that state and local governments will encounter a shortfall of some $50 billion in capital expenditures over the period 1993-2000 in attempting to meet federal water quality and wastewater treatment standards. [Apogee Research, Inc., *America's Environmental Infrastructure: A Water and Wastewater Investment Study*, Prepared for the Clean Water Council, December 1990.]

   The $50 billion estimate is the midpoint in a wide interval: Capital needs were estimated at between $110 and $167 billion (including replacement costs); available investment funds could go as high as $88 billion over the eight years. Thus the shortfall in state and local financing could be anywhere from $22 to $79 billion over the eight years. Over three quarters of the investments are needed for wastewater facilities; the remainder for drinking water. An EPA needs survey one year later estimated 20-year design needs at $111 billion for wastewater treatment facilities alone. [US Environmental Protection Agency, *1990 Needs Survey*, Report to Congress (Washington, DC: US Government Printing Office, November 1991).] With a federal share of 80 percent, up to an additional $5 billion may be needed annually in some combination of grants or loans to state revolving funds and small or disadvantaged communities.

   Other environmental problems, such hazardous waste sites at government and private facilities, will require massive amounts of money but are not generally considered "infrastructure." The Clean Air Act Amendments of 1990 will also require substantial investments, but largely on the part of the private, rather than the public, sector.

42. Felix Rohatyn, "Self-Defeating Myths About America," *The Washington Post*, July 6, 1992. A study by the Economic Policy Institute in 1991 concluded, based on needs assessments, that all federal capital investments must increase by a minimum of $60 billion annually, including a minimum of $23 billion for physical capital (the remainder going for education, training, and R&D). A reasonably similar conclusion was derived from consideration of the historic ratio of federal infrastructure investment to GNP. For example, to return to 1976 levels of federal investment as a share of GNP, in 1990 the federal government would have had to increase outlays by $48.9 billion for all capital investments, including $18.7 billion for physical capital. Jeff Faux and Todd Schafer, *Increasing Public Investment* (Washington, DC: Economic Policy Institute, October 1991).

43. A similar structure called the National Infrastructure Fund was proposed in the 1984 report, *Hard Choices* [US Congress, Joint Economic Committee, *Hard Choices* (Washington, DC: US Government Printing Office, 1984).] The Fund would be capitalized with long-term federal debt issued over a 10-year period and would provide state and local governments with access to capital at reasonable rates.

44. US Department of Transportation, Commission to Promote Investment in America's Infrastructure, *Financing the Future* (Washington, DC: US Government Printing Office, Feb. 1993).

45. Fiber optics, hair-thin lightweight strands of glass which transmit pulses of laser light, is a "broadband" technology, a term conventionally used to describe communications channels with bandwidth great enough to transmit full motion videos. A single strand of fiber in use today can simultaneously transmit thousands of phone conversations; experts suggest "a theoretical carrying capacity of about 600 million [simultaneous] conversations." Yates, "The Promise of Fiber Optics," *Public Utilities Fortnightly*, August 15, 1990, p. 14.

46. Economic Strategy Institute, *The Impact of Broadband Communications on the US Economy and on Competitiveness* (Washington, DC: Economic Strategy Institute, 1992). According to the study: "Broadband networks have already provided major efficiency boosts to the corporations that have installed them." Kodak, for example, reportedly increased output by 10 to 20 percent over a 1 to 2 year period, increased its manufacturing accuracy and speed, and reduced its manufacturing cycle by two weeks.

47. In health care, one study estimates that electronic management of patient information, claims, inventories, and consultations will save $36 billion annually and significantly improve service. "Can Telecommunications Help Solve America's Health Care Problems?" Arthur D. Little, July 1992.

48. The interstate system would never have been built without massive federal investments; government played an equally important role earlier in building the railroad and waterway transport system, and in designing the aviation system. With respect to communications, a different system has always prevailed in this country, with a mixture of private investment and government involvement in the regulation of monopolies, rate-setting, franchises, etc.

49. Ericsson, a Swedish concern, for example, is reported to have 25 percent of the US mobile telephone market. US Congress, Office of Technology Assessment, *Critical Connections: Communication for the Future* (Washington, DC: US Government Printing Office, January 1990) pp. 67-68.

50. Laura D'Andrea Tyson has noted that high-technology industries such as telecommunications "are important to the nation's well-being not only because of their measurable contributions to exports, high-wage and high-skill jobs, productivity, and R&D, but also because of the unmeasurable contributions to the nation's technological capabilities." Laura D. Tyson, *Who's Bashing Whom? Trade Conflict in High-Technology Industries* (Washington, DC: Institute for International Economics, November 1992).

51. Motorola has identified PCS as a $195 billion dollar industry by the year 2010. The FCC estimates that by adding PCS to the mobile services marketplace, the consumer welfare gain might be as high as $2-5 billion a year.

52. It is estimated that the ten year delay in the 1980s in getting cellular telephone to market as a result of licensing and rulemaking delays cost the public approximately $80 billion in lost welfare gains. Robert Pepper, personal communication, November 14, 1992.

53. For example, New Jersey has entered into a social contract with New Jersey Bell to accelerate broadband infrastructure deployment. New Jersey Bell agreed to cap the rate for basic telephone service and accelerate broadband infrastructure deployment in exchange for the deregulation of services other than basic service. The result, announced in November 1992, is the first major "fiber in the loop" deployment to thousands of subscribers.

54. States have a major role in this area; state rate commissions approve the rates on which local telephone companies make investment decisions, and determine accelerated depreciation schedules.

55. Such obligations, in theory, have required that service be provided to all comers at reasonable rates and terms, without undue discrimination to differing customers.

56. In September 1992, the FCC provided that the local exchange company (i.e., the telephone company) is obliged to permit

"competitive access providers" to connect directly into the local telephone exchange. It is expected that this will have profound effects.

57. The 1982 court consent decree which separated Bell's long distance and local services (now AT&T and the regional Bell operating companies, or "RBOCs"), prohibited the RBOCs from engaging in competitive long distance, information, or equipment manufacturing. The 1984 Cable Communications Policy Act limits traditional telephone companies from provision of video programming in their telephone service territory. The intent was to preserve the strong public interest in preventing those who own basic means of transmission (or otherwise control bottleneck facilities or can wield market power) from discriminating against competitors or censoring public speech.

    In 1991 the Courts lifted the restriction on RBOC entry into the information service business. The 1992 FCC "video dial tone" rulemaking was intended to permit telephone company carriage of other parties' video signals. The Burns-Gore bill (S.1200) sought to encourage telephone company deployment of fiber optics by offering the carrot of limited entry into the cable TV business; the stick consists of regulatory safeguards to guard against discriminatory actions historically employed by the telephone company against its competitors.

58. Mitchell Kapor and Jerry Berman, "Building the Open Road: The NREN as Test Bed for the National Public Network," *Building Information Infrastructure*, ed. Brian Kahin (New York: McGraw-Hill, 1992).

59. Open network architecture refers to efforts to publicly define and unbundle network components (e.g., switches and circuits) to encourage unaffiliated vendors to develop products that use and interconnect with the network.

60. Steve Kelman, Jerry Mechling, and John Springett, *Information Technology and Government Procurement* (Cambridge, MA: Strategic Computing and Telecommunications Program, Kennedy School of Government, Harvard University, June 1992).

61. The economic attractiveness of residential installation of fiber optic cable may be enhanced by its usefulness to the utility industry as a means of controlling energy use. See: Steven R. Rivkin and Jeremy D. Rosner, *Shortcut to the Information Superhighway: A Progressive Plan to Speed the Telecommunications Revolution* (Washington, DC: Progressive Policy Institute, July 1992).

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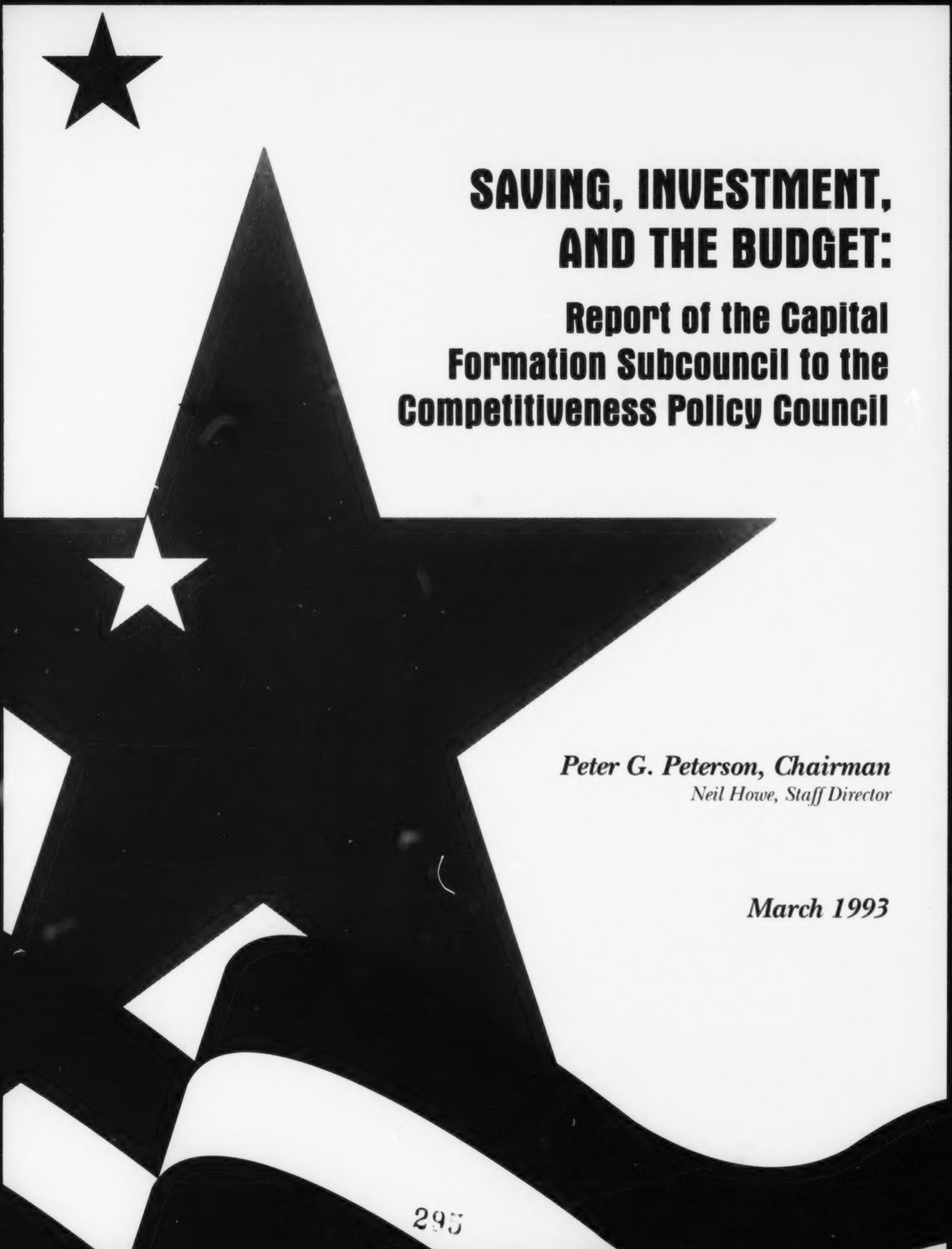

SAVING, INVESTMENT, AND THE BUDGET:

Report of the Capital Formation Subcouncil to the Competitiveness Policy Council

Peter G. Peterson, Chairman
Neil Howe, Staff Director

March 1993

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COMPETITIVENESS POLICY COUNCIL
WASHINGTON, D.C.

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Dear Fred:

We are pleased to transmit to you the report of the Capital Formation Subcouncil. The Subcouncil met four times over the second half of 1992 to examine issues of public and private saving. As you know, discussions at the meetings were lively, with a wide range of views expressed. Our Subcouncil members do not agree on every point in the attached report; however, there are several key points on which we are in full accord.

First, at bottom, the Subcouncil is clear that we must increase our productivity growth. The latest figures are encouraging, but sustained productivity growth will require more investment — much more investment than has been the case until now. That investment must be funded by national saving — to increase the wealth of Americans, reduce long-term interest rates, and ensure that this great country's economic destiny is not subject to the whims of foreign investors. In order to save more, we must temporarily reduce consumption growth. Ultimately, no nation can consume more than it produces and simply borrow the rest. It must eventually produce more and pay back its debt. There are, in other words, no free lunches left. And certainly there can be no justification for slipping our children the check for our own free lunch.

Whatever is done — and a lot must be done — the American people must believe that the burden sharing involved is comprehensive. For any plan to succeed, we must feel — as in the Second World War — that we are all in this *together*. The American people must also feel that any program to get this nation back on a competitive track is fair and will work.

The Subcouncil's work benefitted from a wide range of expert opinions and consultations. We are grateful for the work done by Laurence J. Kotlikoff, the yeoman staff support offered by our Staff Director, Neil Howe, and assistance in drafting the report from Rick Samans and Gilah Langner.

In transmitting this report, I cannot help but note that this effort is but a first step in tackling an economic problem that has grown, largely unchecked, for more than a decade. We are gratified that this problem is now receiving the attention of the nation, and we are pleased to offer this contribution to its analysis and repair.

Sincerely,

Peter G. Peterson
Chairman, Capital Formation Subcouncil

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I. Introduction

In its first report in March 1992, the Council stated that "America's economic competitiveness — defined as our ability to produce goods and services that meet the test of international markets while our citizens earn a standard of living that is both rising and sustainable over the long run — is eroding slowly but steadily."

The best way to grasp the dimensions of our competitiveness problem is to examine the growth of labor productivity in the American economy. As economist Paul Krugman has written: "Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve standard of living over time depends almost entirely on its ability to raise its output per worker."

By this measure, there is little question that the American economy is not doing well. Measured in terms of real gross domestic product (GDP) per employed person, US productivity grew at an annual rate of 1.9 percent between 1947 and 1973; from 1973 to 1988, it has only grown at an annual rate of 0.4 percent. Measured in terms of nonfarm business-sector output per worker hour, the annual growth rate has fallen from 3.0 percent to 0.8 percent, respectively. Either way, this represents a dramatic slowdown in the growth of real product per worker — and, as a consequence, in the growth of real income per worker.

How do these figures translate into simple dollars and cents? In 1973, the typical full-time American worker produced $40,400 in GDP (adjusted for inflation to 1992 dollars). In 1990, if productivity had continued to grow at its pre-1974 rate, he or she would have produced $55,600, for an increase of $15,200. In fact, the American worker produced only $42,400, for an increase of only $2,000. Since a large and relatively stable share of GDP — roughly 75 percent — goes straight to the worker in the form of earnings and benefits, this difference in productivity — $15,200 versus $2,000 — inevitably shows up in the typical household standard of living. In effect, by 1990 the slowdown in productivity growth was costing us $13,200 in income per worker per year. Lower personal income also means lower government revenues. By 1990, we would have had $530 billion in extra revenue at current tax rates, enough to balance the budget as well as to pursue any number of desirable social ends which we cannot now afford.

In general terms, then, our objective is to raise total living standards for American society over time through a higher level of productivity. The Council has established a specific goal of raising long-term growth in real output and real pay per worker by roughly one percentage point per year above its historical trend since 1973.

To illustrate this goal in operational terms, let's start with real GDP per worker (in constant 1990 dollars). If future productivity growth continues along its 1973-1990 trend, real GDP per worker will grow from $42,400 in 1990 to $47,800 in 2020 — an increase of only $5,400 or 13 percent over 30 years. At this rate, it would take 174 years to double living standards. Total government revenue (at unchanged tax rates) will increase by $450 billion, or by $1,860 per worker.

If, however, future productivity growth were raised by one percentage point per year, real GDP per worker would reach $64,300 in 2020

— an increase of $21,900 or 51 percent over 30 years. Total government revenue would increase by $1.2 trillion, or by $7,500 per worker.

These scenarios are, of course, only illustrative. We cannot expect to launch such a dramatic improvement in productivity growth overnight; on the other hand, we may be able to achieve greater productivity gains over time. But these figures do point out the magnitude of the improvement. At the end of two or three decades, it would represent a dramatic elevation in household living standards — and a dramatic increase in the public resources available to meet future national challenges and to enhance the quality of national life. It would be enough to leave an economic legacy to our children that all Americans could be proud of. It would be enough to change the destiny of our nation.

The Link Between Productivity and Capital Investment

There is no simple or single explanation for America's recent declining productivity performance. In part, the problem reflects trends that are affecting all of the industrial world — such as a global slowdown in technological innovation and a global demand shift toward innovation-resistant services. Policy experts can point to a wide assortment of other persistent or temporary conditions that may have had a uniquely negative effect on the US alone: the impact of higher energy costs, the declining average age of the work force, inadequate business-government cooperation on trade and R&D, ineffective schools and worker training, problems in corporate governance and managerial incentives, tax-code distortions, the growing deadweight costs of litigation, changing cultural attitudes toward work, social fragmentation, and so on. These indeed are all part of the story.

Yet most experts also agree that there is one basic malady affecting US productivity performance that stands out in importance from all the others: inadequate capital formation. According to nearly every economic thinker who has reflected on the matter, how well and how much a society invests plays a critical role in determining how fast its living standards will rise. Investment in this context is defined as the dedication of resources to pursuits which raise future output. It encompasses not only easily defined physical or fixed assets, but also "invisible" forms of capital such as improved human skills and production processes. According to some economists, the rate of capital formation — broadly construed — may account for as much as two-thirds of the growth rate in real product per worker.

In its deliberations, the Subcouncil examined the means by which higher capital investment contributes to higher national output and living standards. First, by definition it expands the supply of a key factor of production, the nation's capital stock, resulting in added output. Second, higher capital investment improves the return on another key factor of production — labor. Raising the amount of capital employed per worker tends to raise output per worker. As labor productivity increases, so do wages.

Third, capital investment often embodies new technical developments which enhance efficiency and raise output beyond what would otherwise be possible though an increase in the capital-labor ratio. It is typically the vehicle by which the fruits of research and development are transmitted from the laboratory to the marketplace. Examples of such technical improvements include a new generation of production equipment or a new production process. Finally, higher capital investment has been demonstrated to spur added investment in human capital — i.e., in education, management and training skills which leverage the effect of an increase in the volume of physical capital on economic growth. Indeed, there is evidence that on the job "learning-by-doing" has the highest productivity payoff of any investment in human capital.

How much does productivity growth respond to additional capital formation? The Subcouncil considered a variety of theoretical and empirical economic research on this subject. Traditional economic theory suggests that the elasticity of output per worker with respect to capital employed per worker is about 0.25 to 0.33. For every one percent increase in the capital-labor ratio, productivity can be expected to rise by one quarter to one-third as much. However, empirical research comparing US rates of capital investment and productivity growth to those of our major economic competitors suggest a stronger relationship, perhaps as much as unity.[1]

Since the early 1950s, the productivity growth rate in each of the industrial market economies has been highly correlated with each economy's rate of investment. Situated at the extreme high end of the productivity and investment distribution is Japan; situated at the extreme low end is the United States. The European economies tend to fall in between. Since the early 1970s, moreover, the secular stagnation of US national income per worker has roughly coincided with a parallel decline in US rates of net national saving and net domestic investment, both of which have fallen steadily over each half-decade period since the late 1960s.

Recent economic research indicates that capital formation's contribution to productivity growth is indeed greater than the 0.25 to 0.33 factor suggested by traditional economic growth theory. By taking into account such indirect effects as the technological change and augmented human capital formation brought on by higher investment, some economists have raised the estimate of capital's contribution to growth in output to about 0.50.[2]

The Link Between Capital Investment and Saving

If productivity growth is influenced heavily by capital investment, what determines the level of investment? The Subcouncil considered both theoretical and empirical research bearing on this question. Both lead to the conclusion that domestic capital investment closely tracks the supply of domestic savings.

Economic theory teaches us that the allocation of a nation's resources between consumption and investment is determined by saving. In practical terms, private individuals and households decide how much of their current income to save rather than consume; private businesses decide how much of their earnings to retain rather than pay out as dividends; and governments decide how much to spend and tax, with surpluses augmenting and deficits diminishing the saving done in the private sector.

The supply of savings influences how much capital investment businesses undertake through its effect on the cost of capital. The smaller the pool of savings available to be lent for this purpose, the higher real interest rates will be. Higher real interest rates mean that fewer capital projects can be financed at a profit. They contribute to shorter planning horizons by depressing the value of future earnings in relation to current earnings. A rational manager will find fewer investment projects make sense when the cost of capital is high than when it is low.

In the United States, there has been a dramatic shift in the application of new economic resources to consumption rather than investment over the past two decades. Personal consumption expenditures are now at a post World War II high of about 75 percent of national income, up from an average which fluctuated at about 68 to 70 percent prior to 1970. At the same time, net private domestic investment has fallen from about 8 percent to 5 percent of national income. In effect, our society has decided to consume about 5 percent more of its national income each year than it did a few years ago. Reflecting this choice, net domestic investment has fallen by about 3 percent of national income. The 2 percent difference is attributable to the fact that we borrowed capital from other countries to make investments for which we had insufficient savings.

Indeed, a country can invest more than it saves and have lower real interest rates than would otherwise be necessary by borrowing from abroad. However, like a household, it will not be able to live beyond its means indefinitely. At some point, as debt service grows in relation to output, foreign creditors are likely to become concerned about the overextended economy's capability to honor all of its obligations. For this reason, levels of domestic savings and domestic investment tend to diverge only temporarily and to a modest degree. In the long run, increases in the supply of funds available for capital investment must come from higher national saving.

Net saving in the United States is not only low by historical standards; it is low by international standards as well. The United States has been trailing Japan and Europe in net national saving just as dramatically as it has been trailing in capital investment and productivity growth. The decline in national saving during the 1980s had by 1990 reduced US capital stock growth by about 15 percent. This has reduced potential GDP growth by about 5 percent below levels consistent with the pre-1980 saving rates. These losses are projected to double by the end of the century in the absence of corrective action. In other words, the cost of our lower national saving during the 1980s now amounts to close to $300 billion per year in foregone output, a level that will continue to rise.

Why is the US Saving Rate So Low?

The United States has the lowest net saving rate of any major industrialized country. From World War II tọ 1980, our net saving rate averaged about 8 percent of national income, already relatively low by international standards. However, the rate dropped to only 2 percent during the 1980s. A pronounced decline in private sector saving accounted for slightly more than half of this dramatic change, while larger public sector deficits accounted for slightly less than half.

The reasons behind the decline in private saving are not fully understood; however, there is considerable agreement on a few factors. First, corporate retained earnings declined markedly in the 1980s as companies restructured their balance sheets by substituting debt for equity. As a result, more of the return on capital is now being paid out in the form of interests payments, depressing the level of corporate saving. Second, personal saving not only failed to compensate for dissavings in the corporate sector, but dropped in its own right. Part of the reason for this may lie in the run-up in asset values during the 1980s. Pension fund contributions comprise a large proportion of personal saving. Higher stock prices depressed the level of pension fund contributions by rendering many defined benefit programs over-funded under IRS interpretations. When this occurred, employers were unable to deduct further contributions for tax purposes. The inflation of house prices in much of the country appears to have had an analogous effect on households. Families with large capital gains on their residences have had less of an incentive to save as much of their income.

The decline in public saving is more clear-cut. Although state and local government budgets have been buffeted by declining federal funding and the recession, their share of public dissaving during the 1980s was inconsequential compared with that of the federal government. The federal deficit rose from about one percent of GDP in the 1950s and 1960s to about 2 percent of GDP in the 1970s. Over the last decade, the deficit averaged 4 to 5 percent of GDP and accounted for roughly two-thirds of all private saving. Moreover, the problem is projected to worsen over the next decade. As outlined below, much of the growth in this number in the 1980s was attributable to large increases in defense, entitlement, and interest expenditures and a significant decline in revenues as a share of GDP.

II. A Capital Formation Agenda

The Subcouncil devoted much of its first meeting to the task of determining what the objectives of a capital formation agenda should be. There was considerable agreement on a number of points:

(1) The Subcouncil should attempt to determine the amount of increased capital investment that would be necessary to achieve the overall goal set by the Council of increasing the long term US productivity growth rate from less than 1 percent to 2 percent.

(2) Given the central role of domestic savings in determining domestic investment, the Subcouncil should in turn identify how much net national saving must increase to yield the necessary boost of investment. In effect, how much of an increase in saving today is necessary to raise future consumption?

(3) Most participants believed that the Subcouncil should focus on the composition as well as the volume of investment. Distortions in the US economy which discourage long-term investment should be addressed at the same time as efforts are made to boost saving. In the absence of such measures, it was feared that added saving may be applied to activities with a less than optimal effect on US productivity growth and living standards. For example, an increase in domestic savings which served merely to boost foreign investment would benefit mainly the owners of capital. It would not necessarily contribute to higher American labor productivity and higher living standards for the overwhelming majority of Americans whose income is primarily wage income. Accordingly, support was expressed for steps to improve incentives for investment in domestic business plant and equipment.

(4) A number of participants stressed a complementary goal of improving the inter-generational distribution of fiscal burdens in our society. Savings must be raised today to avert significantly higher tax rates on future generations. They proposed that the Subcouncil should set a discrete goal of funding a large part of future liabilities with the aim of stabilizing lifetime tax rates for future generations of Americans.

(5) Whatever is done, the Subcouncil members believe that the success of the agenda will ride crucially on the belief on the part of the American people that the burden sharing is *comprehensive*, and that just as in the Second World War, we are all in it together. The program will also depend on its *fairness*. It will be important to demonstrate that both the burdens and the benefits of the strategy will be shared equitably.

Setting Targets

How much must the US raise savings and investment levels in order to increase long run productivity growth by one percent per year? The Subcouncil approached the question from a number of angles. It considered empirical comparisons with previous high growth periods in US history and with the post World War II experience of our major competitors, Europe and Japan. In addition, it commissioned exercises in econometric modelling from the Council on Economic Development and DRI, Inc.:

▶ *Historical comparison.* A net saving and investment rate of roughly 10 percent of GDP would be approximately the average for the United States during the postwar decade in which it grew fastest, the 1960s. Such a level would be above the average rates registered from the 1930s through the 1950s; however, it would be well below the average for the half-century preceding the Great Depression.

▶ *International comparison.* If the US were to raise its net savings rate to 10 percent of GDP, it would be almost exactly on par with the average for European industrial nations since the early 1970s, although still quite a bit below Japan (at roughly 18 percent of GDP). Not coincidentally, nearly all of these European nations have enjoyed per-worker GDP growth rates that are 0.5 to 1.5 percentage points higher than the US rate (2.5 percent for Japan).

▶ *Econometric growth modelling.* The results of such modelling are sensitive to assumptions made about capital investment's contribution to growth (the elasticity of output with respect to capital); the share of saving retained for domestic as opposed to overseas investment; and the share of domestic investment flowing to business, as opposed to residential, investment. As illustrated in the accompanying table, the increase in national saving required to raise productivity growth by one percent ranges from a low of 3.2 percent of GDP to a high of 9.8 percent of GDP, depending upon which assumptions are used (see Table 1).

Table 1

Required Shift in National Saving to Increase Productivity Growth of Nonresidential Business Product by One Percentage Point

Assuming Capital's Contribution to Growth = 0.25

Share of domestic investment flowing to business investment		Share of saving retained for domestic reinvestment: 0.80	Share of saving retained for domestic reinvestment: 0.65
	0.75	6.3% of GDP 7.1% of NDP	7.8% of GDP 8.8% of NDP
	0.67	7.1% of GDP 8.0% of NDP	8.7% of GDP 9.8% of NDP

Assuming Capital's Contribution to Growth = 0.50

Share of domestic investment flowing to business investment		Share of saving retained for domestic reinvestment: 0.80	Share of saving retained for domestic reinvestment: 0.65
	0.75	3.2% of GDP 3.7% of NDP	3.9% of GDP 4.4% of NDP
	0.67	3.6% of GDP 4.0% of NDP	4.4% of GDP 4.9% of NDP

SOURCE: Van Doorn Ooms, Committee for Economic Development

Based on this information, there was considerable agreement that an appropriate target would be to increase net national saving and investment to 10 percent of GDP, approximately the level of most of our European competitors. Compared to the 1985-1991 period, such a target would require nearly tripling our net savings rate and nearly doubling our net investment rate. As a share of GDP, these targets would require raising net national saving by 6.5 percentage points and net domestic investment by 4.5 percentage points. An additional target would be to dedicate an extra 1.0 percent of GDP toward publicly-financed social investments with high long-term economic returns. Altogether, then, the Subcouncil proposes a total public and private sector shift from consumption to savings of about 7.5 percentage points of GDP.

Where Will the Money Be Used?

Americans are more likely to forego a degree of consumption in favor of increased savings if they can be assured that such sacrifice will result in investments which are likely to raise labor productivity and generate future increases in living standards. For this reason, it would be advisable to set explicit goals for the composition of domestic investment as well as its absolute volume.

The Subcouncil considered evidence that during the 1980s available savings were not applied to the most productive mix of investments. While non-financial corporate debt rose considerably, capital expenditures did not increase much beyond the level at which funds were generated internally. In effect, much of the added debt financed corporate restructuring and real estate, not new investment in plant and equipment. Similarly, extensive borrowing by the public sector did nothing to reverse the decline in investment in infrastructure and other forms of public sector fixed capital. The ratio of public capital to labor has been stagnant for two decades. Most of the federal government's record borrowing — much of it from overseas — was consumed by operating expenses.

In the private sector, the Subcouncil calls for steering the extra investment entirely to where it is most needed: nonresidential plant and equipment. Compared to the 1985-91 base, the rate of net business investment would more than double, 2.7 to 6.4 percent of GDP. Achieving this target would still leave us far behind Japan, but it would bring us roughly to par with most of our other industrial trading partners. Net residential investment, on the other hand, could stay about where it is today, at 2.1 percent of GDP.

While public sector investment can be boosted directly by public policy, government can influence private sector investment only indirectly, mainly through specific incentives or a general improvement in the macroeconomic climate. One specific incentive, an investment tax credit, has been proposed by the Manufacturing and Technology Subcouncils and is aimed at stimulating additional investment in productive plant and equipment. Similarly, the Subcouncil on Corporate Governance and Financial Markets has proposed a number of principles to guide the process by which companies are owned and controlled. A properly functioning board of directors and process of investor oversight is essential to business capital formation. The Capital Formation Subcouncil did not focus its attention on the question of the composition of investment, although it recognizes the importance of corporate decision-making in allocating capital to productive ends. (The Competitiveness Policy Council will be establishing a new Subcouncil in 1993 to examine Capital Allocation issues.)

With respect to the macroeconomic climate, a key benefit of an increase in national saving is likely to be a sharp decline in interest rates, particularly long-term real rates. At 4 to 5 percent — a nominal rate of 7.5 to 8 percent compared with inflation of 3 to 3.5 percent — real long-term interest rates remain extremely high in the United States, especially after four years of sluggish economic growth. The targeted increase in national saving could cut these rates in half. This would sharply reduce the cost of capital to American business and remove a major impediment to long-term capital investments. Lower interest rates would also spur a pick-up of growth in the short run, perhaps well before the increase in savings actually took effect because of the anticipatory tendencies of the financial markets.

Some of the highest-return investments in productivity growth — infrastructure, public-use R&D, education, and worker retraining — cannot be financed by private capital markets alone. Accordingly, the Subcouncil calls for an increase of 0.8 percent of GDP in infrastructure investment and 1.0 percent of GDP in human capital investment — roughly $55 billion and $70 billion, respectively, by the end of the 1990s. This would reduce the backlog of under-funded and unfunded needs. Allocating the human and physical capital budget among competing needs will take special skill. However, a restoration of an internationally competitive level of public investment in infrastructure, education, civilian research, and development will help raise the quality of both physical and human inputs (and could serve as a form of defense conversion policy) with significant implications for productivity growth. As always, the major challenge in public sector investment will be avoiding pork barrel and assuring that the investments are well-conceived, well-planned, and well-executed.

Timing

Timetables can be crucial for the success of this program. For economic as well as symbolic reasons, a tempting and feasible deadline is the year 2000 or 2001. Clearly, the effort must be long-term. Our country has taken many decades to turn itself into a high-consumption economy. Any attempt to become born-again savers overnight will be doomed to failure. It would almost certainly trigger a new recession. Although the US has never before attempted a deliberate and targeted effort to raise its rate of capital formation, it is worth noting that a substantial savings shift occurs spontaneously during most economic recoveries. Timed to coincide with a long recovery, an 8 point shift seems feasible within 8 or 9 years — but not within a deadline much shorter than that.

On the other hand, the goal must be near enough to energize political leaders and enable the public to anticipate the economic payoffs within a realistic time horizon. One payoff is the higher rate of economic growth, which it should be possible to achieve soon after the capital formation targets are achieved. Another way to conceptualize the payoff is to try to identify the "consumption crossover date," the time when total national consumption will exceed what it would have been under a no-agenda baseline scenario. Embarking on the proposed schedule, we would have some reason to promise the typical American family an appreciably higher level of personal consumption near the end of the program. That takes us to the turn of the century, about a decade before the Baby Boom demographic bulge begins to hit age 65 — and when the public and private costs of dealing with an aging society begin to mount rapidly. On a slower schedule, the payoffs might come too late.

An equally important timing issue is when the various policy measures to stimulate investment and savings should be implemented. Every effort must be made to avoid undue drag on the economy at a time when the recovery from the 1991 recession remains tentative. For this reason, Subcouncil members were in favor of front-loading investment measures where possible and delaying slightly the bulk of measures which would have a contractionary effect on demand (i.e., any significant revenue increases by the federal government). At the same time, the Federal Reserve should consider accommodating the likely effect of savings measures on aggregate demand in fashioning money supply growth targets. A nearly 8 percent of GDP shift from consumption to savings should give the Fed considerable latitude to ease rates from levels that would otherwise be appropriate.

At the same time, it would be counterproductive to defer all revenue increases and spending cuts until the final years of the program. This could aggravate the current generational imbalance in US fiscal policy. The crisis in US saving rates stems in no small part from the failure of current generations to pay their fair share of the burden of financing the govern-ment's time-path of consumption. One certain way to induce Americans to consume less so that the nation will save more is to raise the present value of adult Americans' remaining lifetime net taxes. Delay only diminishes the response to the problem.

Private or Public Savings?

Our target is to increase national saving by about one percentage point of GDP per year ($60 billion at current prices) over the eight-year transition period. There are two ways to increase national savings: by raising private (household and corporate) savings and by reducing public dissaving (the budget deficit of the federal government). Each is discussed below.

III. Private Saving

The Subcouncil examined a number of proposals, and previous policy initiatives, to promote private saving. Some would aim to stimulate such saving directly: Individual Retirement Accounts (in several variants), cuts in the capital gains tax, elimination of taxation of interest and dividend earnings (a la Japan's *maruyu* system), and mandatory pension plans for all American workers. Some proposals would seek to raise private saving by discouraging consumption: a general consumption tax (which would exempt all saving from taxation), taxes on specific components of consumption (especially energy, tobacco, and alcohol), or a value added or national sales tax. Other anti-consumption options include eliminating (or limiting) interest deductions (notably on housing) and/or corporations (notably on their borrowings).

The Subcouncil commissioned a study by Professor Laurence Kotlikoff of Boston University which evaluated various proposals to stimulate private savings.[3] Kotlikoff concluded that most of the proposals that aim to increase private saving directly are unlikely to produce any net increase in national saving. Some of the tax-subsidized devices, such as liberalized IRAs, lead mainly to switches in the form of private saving (for example, households shifting income to IRAs from other savings accounts) rather than to any significant net increase. Moreover, all of them reduce government revenues and are likely to subtract as much or more from public saving as they add to private saving. It must be noted that private saving dropped sharply in the 1980s despite the institution in the early part of the decade of a number of such "incentives."

Kotlikoff found that IRAs in particular permit households to reduce the present value of their lifetime taxes without reducing their consumption or increasing their labor earnings. Furthermore, in providing households with positive income effects (raising their lifetime after-tax income), IRAs actually induce more current consumption and less current labor supply, thereby lowering national saving. In effect, IRAs and other types of tax-subsidized incentives permit tax arbitrage among middle and upper income households which can reduce the present value of their remaining lifetime taxes simply by moving money that they (a) previously had saved; (b) would otherwise have saved; or (c) had recently borrowed, from a non-tax-favored into a tax-favored account.

Another possibility is mandatory portable defined contribution pension plans funded jointly by employers and employees. The idea has two components. One is to require pension plans for all employees, including the half of the labor force which now carries no such plans — and which generates little or no saving. There would be no favorable tax treatment for these plans so no offsetting loss of government revenues would result. Institution of such plans would thus *ipso facto* increase private and overall national saving (assuming no concomitant decline in personal saving).

The other component of the idea is to emphasize defined contribution plans rather than defined benefit plans. Defined contribution plans require an annual set-aside for saving purposes. By contrast, defined benefit plans can actually reduce savings when earnings on previous contributions rise beyond expectations (e.g., due to a sharp rise in the stock market) and thus reduce (or even eliminate) the need for subsequent contributions to produce the targeted level of retirement benefits. In the early 1980s, for example, a number of corporate pension plans of the defined benefit variety became over-funded, as a result of high interest rates and equity appreciations, and actually returned cash to the parent company — hence generating substantial levels of corporate dissaving.

However, Subcouncil members were concerned that such a program would levy considerable cost on employers. An employer contribution of 50 percent to a mandatory pension of 5 to 10 percent of earnings, extended to the one half of all employees who now have no plans, could raise private saving by as much as one percentage point of GDP but would add 2.5 to 5 percent to payroll costs, in the first instance. It appears quite possible that employers will soon be called upon to pay more to cover the health insurance needs of their workers. They may also be asked to increase their contributions to worker training. Additional payments for new pension programs, in conjunction with these other new "pay or play" programs, would harm the competitive position of American industry.

One other idea seems simplistic on its face but could have considerable merit: a moral suasion campaign led by the President to persuade Americans to save more. Few Americans know how much they save, relying wholly on Social Security and (in some cases) their company pension plans. In fact, relatively few Americans save anything at all outside these channels. Even more, most Americans probably think that consumer demand — rather than saving — is the key to economic prosperity. What is needed is a clear and consistent explanation of the difference between short-term and long-term growth, and the need for our society to invest in its long-term future through increased saving.

Going one step further would be an education campaign to encourage saving. Professor Kotlikoff suggested that the government could, for example, develop saving norms for different income groups to implement the national saving goal recommended in this report, and inform every citizen of the implications for his or her personal situation. The Social Security Administration now provides all participants with full information on their contribution and prospective benefits but only upon request; it could do so annually on its own initiative as a basis for providing every adult, or at least those who seek it, a recommendation for the level of additional saving needed to meet normal retirement and other objectives.

Finally, there *is* an effective if indirect way in which policy can promote private saving. This is to discourage private consumption, primarily by increasing the taxation of consumer goods and services. A dollar's decline in consumption, given any fixed level of income, automatically becomes a dollar's increase in saving. However, consumption taxes raise other public policy concerns. They have a disproportionate impact on those least able to make financial sacrifices and they can present a short term obstacle to economic growth and stable prices. These and other policy measures are taken up in the next section.

IV. Public Saving: The Budget Deficit

Given the lack of reliable policy tools to directly increase private saving by a substantial amount, it will be necessary to focus the public policy response on public dissaving. There is no escaping the need to alter the fiscal position of the federal government. This is society's best hope for achieving the goal of raising national saving by 5 to 7½ percent of GDP. As a result, the Subcouncil devoted the better part of two meetings to this topic.

Recent events, including the 1992 Presidential election, have made reducing the federal budget deficit a familiar, if elusive, goal. There is no shortage of analysis on the effects of the deficit on the capital market — our budget deficit consumes over two-thirds of all national saving, leaving few domestic resources to finance private investment — as well as on our ability as a society to finance the programs we value.

A critical goal which most Subcouncil participants agreed upon can be simply stated: to eliminate the fiscal deficit over an eight-year (two Presidential term) time frame — and to do so while at the same time financing a number of critical investment-oriented programs proposed by the other seven CPC Subcouncils.

Some participants preferred a more flexible goal: to reduce the deficit so that the national debt declines over time as a share of the gross domestic product. Nonetheless, these participants were in agreement with the fundamental goal of achieving a dramatic reduction in the fiscal deficit in a fashion which takes appropriate account of the need to foster economic growth.

The Congressional Budget Office (CBO) baseline currently projects a consolidated deficit (inclusive of Social Security and other Trust Fund surpluses) of $310 billion for 1993 or 5 percent of GDP.[4] The baseline deficit falls slightly in the mid-1990s only to rise again to a level of 5.8 percent of GDP ($513 billion nominal) by 2001. It is estimated that initiatives recommended by the other CPC Subcouncils (see Table 2 on page 317) will add $98 billion to this deficit, increasing it to roughly 6.8 percent of GDP. However, because most of this new spending will be directed to infrastructure and human capital projects, which represent additions to national investment rather than consumption, eliminating the deficit with these new expenditures included would actually increase national saving, other things being equal, by roughly the 7.5 percent of GDP level targeted by the Subcouncil.

Alternatively, the Subcouncil could have chosen to concern itself with the unconsolidated budget deficit, i.e., the deficit not counting Social Security and other programs which have dedicated trust funds. Owing in particular to the large annual surpluses now being generated by the Social Security Trust Fund (currently in excess of $50 billion), the budget deficit on an unconsolidated basis is considerably larger than the consolidated deficit of $310 billion. The former measure of the deficit gives a clearer picture of the magnitude of the imbalance in the federal government's operating account. However, because it overstates the amount of borrowing the government undertakes in the private credit markets, it exaggerates the impact of the deficit on national saving. For this reason, the Subcouncil focused on the consolidated deficit.

The bottom-line question, then, is how to find $408 billion (the current dollar FY 1993 consolidated deficit plus the current dollar equivalent of the $98 billion in new CPC-proposed spending) in outlay cuts or revenue hikes relative to the baseline by fiscal year 2001 and how to prevent the increase in the baseline deficit from 5 percent to 5.8 percent of GDP (approximately $70 billion in nominal 2001 dollars) as projected by CBO.

Principles

The Subcouncil believes that deficit reduction should be guided by the following principles:

(1) ***Emphasize permanent, structural savings and avoid one-shot measures.***

(2) ***Phase in most consumption sacrifices as slowly as possible.*** Most of the cuts in benefits and household tax expenditures should not be fully phased in before 2001. The specific outlay hikes and tax cuts, by contrast, should be scheduled to take effect much more rapidly. This approach would make the plan stimulative in the short run, which is what many economists advocate in view of the economy's relatively slow recovery from the recent recession. However, to lend the plan maximum credibility, as many changes as possible should be legislatively enacted as early as possible, even if their full implementation is delayed several years.

(3) ***Spread the burden fairly over all income groups.*** The burden of deficit reduction should be distributed among the various segments of the population and beneficiaries of federal programs according to their ability to pay or do with less. Senior citizens, the middle class, the wealthy — all should be required to pitch in to some degree.

(4) ***Protect households near the poverty line and improve the progressivity of the federal tax code.*** The search for new revenues should emphasize measures which raise funds from the sources which have the greatest capacity to contribute and whose share of the burden of federal taxation has declined in recent decades. Those aspects of deficit reduction which would have an undue impact on the poor and working poor (i.e., consumption taxes) should be offset where possible by countervailing measures to reduce their impact on the less fortunate. Indeed, two studies by the Congressional Budget Office and KPMG Peat Marwick conclude that the federal tax system became markedly more regressive in the 1980s. There was an increase in the tax burden of more than two percent of income for both lower- and middle-income families during this period and a drop of more than one percent of income for upper-income families.

(5) ***Prepare the economy (and society) for the impending aging of our population.*** The coming "retirement boom" is much more than just a distant echo of the post-war babyboom. It is a relentless structural change in the age distribution of the American population due to later marriage ages, lower birth rates, earlier retirement, and greater longevity. By 2010, the age composition of the entire country will be similar to that of Florida today, and that's before the first "Baby Boomer" reaches age 65. By the middle of the next century, even the government's optimistic projection indicates there will be no more than two wage earners for every Social Security or Medicare beneficiary. The fiscal implications for our current system of elderly entitlements — especially once the accelerated aging of America begins to compound the cost explosion already affecting public health care benefits — are a cause for concern. For this reason, many members believe that deficit reduction should emphasize measures that encourage a somewhat later retirement age, trim the long-term cost growth of pension benefits, and strip away many of our tax and benefit subsidies for excessive health care consumption. Other members believe that the 1983 Social Security reforms and the funding of the federal employee pension benefits provide adequate funding well into the next century.

(6) ***Reduce distortions by restructuring tax incentives as much as practicable away from consumption and toward saving and by encouraging the flow of resources away from areas of over-subsidized consumption and investment.*** The vast

majority of revenue increases should be obtained by new taxes that target consumption and improve the progressivity of income taxation. The plan should seek to reduce the overall tax rate on the return to productive human and physical capital. Health care and real estate represent two areas in which society's resources could be deployed more productively.

Major Components of the Budget

Before outlining specific budget reduction options, it is useful to enumerate some of the major components of the budget and provide a brief assessment of baseline estimates and trends.

Defense Discretionary Outlays

With the independence of the Eastern European states, the federalization of the former Soviet Union, the collapse of the Russian economy, and the urgent diplomatic efforts to put final closure on the Cold War, there is widespread agreement that the US can scale back the resources committed to its federal defense budget. The issue is not whether we should begin cutting back on defense. In fact, ever since the late Reagan years, such cuts have already been under way. From a peak of $341 billion (in 1992 dollars) in FY 1987, defense outlays have declined to $304 billion in FY 1992 — a real cut of $37 billion. Similarly, from a peak of 6.9 percent of GDP in FY 1986, defense outlays have declined to 5.2 percent in FY 1992 — a cut of 1.7 percent of GDP.

Rather, the question today is how much we can or should prune defense even further in the years to come. In the opinion of many defense experts and geopolitical strategists — along with most elected officials — the answer is straightforward: we can still cut plenty. The CBO baseline already projects a $49 billion real defense reduction between FY 1992 and FY 1995 (thereafter followed by no real-dollar change). And the most-publicized new plans advanced this year have proposed even bigger cuts, ranging from $3 billion in the initial Bush Budget to $89 billion in the Brookings Institution's "Low Option" plan. For all such plans, the size of the spending cut ordinarily reflects the size of the manpower cut — since "force reductions" constitute the largest single source of savings.

Choosing a long-term projection for defense outlays implies making complex assumptions about deterrence, alliances, the probability of defense emergencies, and the effectiveness of different military force structures — matters that were beyond the Subcouncil's purview. The defense cuts proposed below represent an average between the two reasonable, alternative programs recommended by Secretary of Defense Aspin when he was Chairman of the House Armed Services Committee. Aspin's "Force C" Plan cut outlays by $45 billion beyond the CBO baseline, reducing them to 3.2 percent of GDP. Aspin's "Force B" Plan cut outlays by $73 billion (to 2.9 percent of GDP).

Domestic Discretionary Outlays

Domestic discretionary is smaller than the defense budget and less than a third of outlays for entitlements and other mandatory programs. Approximately half of the $232 billion projected to be spent in FY 1993 is applied to social needs, including $48 billion for income security and veterans, $37 billion for education and training and $20 billion for health care and research (apart from Medicaid and Medicare). Much of the remainder is spent on transportation ($36 billion), space, science and energy ($23 billion), and natural resources ($21 billion).

Domestic discretionary spending is a modest part of the budget and has been declining as a share of total federal spending. During the 1980s, it declined from 4.9 percent to 3.3 percent of GDP. After rising slightly during 1990-2, CBO projects that it will remain stable generally stable during FY 1994 and FY 1995, the final two years of the spending cap set by the Budget Enforcement Act. Spending is projected to rise with inflation thereafter.

Two approaches to domestic discretionary spending are often considered. The first — and by the far the simplest — approach is to target an overall reduction level for spending through current programs. One possibility is to set a specific percentage reduction target for all domestic programs. The second approach is to try to identify every item that should be cut, adding up the resulting savings. Because the domestic discretionary portion of the budget includes such an extraordinary diversity of items — everything from the civil service payroll to drug interdiction to national parks to adoption services to food inspection to highway construction — this would be a daunting project, to say the least. Commissions could be (and have been) appointed just to identify all the likely candidates for trimming. The Subcouncil has compiled a selected list of such options below.

Mandatory Outlays—Health

There are two important reasons for treating health-care entitlements separately from other entitlements. The first is their meteoric rate of current and projected growth. From 1965 to 1990, total federal health outlays have grown from $5 billion to $195 billion. From 1990 to 2000, the CBO baseline projects that they will climb to $566 billion — moving in just 10 years from 16 to 27 percent of all federal outlays. Meanwhile, total US national health spending is projected to rise from 12 to 18 percent of GDP. One estimate from the Health Care Financing Administration suggests that likely future trends in technology, patient use, disabilities, and aging — combined with current fee-for-service reimbursement systems — could push national health-care spending to an economy-shattering 44 percent of GDP by the year 2030. Since nearly one-third of national health-care spending is funded by the federal government, such spending is directly linked to the national cost problem — just as the national cost problem feeds back into uncontrollable outlay growth. Simply put: without radical health-care cost control, no long-term strategy to balance the budget can possibly succeed.

The second reason is the growing public demand that we do something to guarantee access to some standard of affordable health care for the sizable number of Americans (30 to 40 million) who currently find themselves uninsured. In other words, it is not enough to control the cost of our current system of public health-care entitlements; we must at the same time extend health insurance (and perhaps, to some extent, the utilization of costly acute-care services) to those who are now outside the system. This makes the challenge doubly difficult.

As with defense outlays, the Subcouncil made no independent estimate of the budget impact of health care reform. It is assumed that reform will trim costs below the rapidly expanding CBO baseline figure by enough to finance coverage of the population which now has no health insurance — and thus no net impact on the budget as a whole is projected from the coming changes in the health care program.

Other Entitlements

Among non-health entitlements, benefits that do not require a means test deserve special attention — not only because they cost so much (over $415 billion in 1992), but also because they do such a poor job in targeting the needy and offer such vast and unearned windfalls on prior "contributions." In calendar year 1991, for example, an estimated $84 billion in Social Security and federal pension benefits went to households with annual cash incomes of over $50,000. The vast majority of these beneficiaries are receiving benefits well in excess of everything paid into the system on their behalf (plus interest). It is widely believed, moreover, that the retirement ages and pension benefit levels available to federal Military and Civil Service employees greatly exceed those of private-sector employees with similar job descriptions.

There is also a long-term demographic challenge — call it the "graying of America" — that sooner or later must be confronted within the confines of the budget. Because Americans over age 65 receive such a vast share of these benefits (in fact, they receive over 60 percent of all federal entitlements), total federal outlays will undergo a powerful upward push once the post-1946 baby boom cohorts begin retiring in the first decade of the next century, just beyond the CBO projection period. In 1983, Congress passed a package of Social Security reforms intended to cope with this problem, most notably a series of increases in the payroll tax which funds this program. As a result, Social Security is currently running annual surpluses in excess of $50 billion and is forecasted by the Board of Trustees of the Social Security Trust Fund to be in sound internal financial condition until 2036.[5] For this reason, some Subcouncil members believe that Social Security benefit cuts should not be included in the current effort to reduce the fiscal deficit. Nonetheless, the majority of Subcouncil members believe that the baby boom's impending demographic push — and especially its multiplicative interaction with health-care spending — suggests that the 1990s may be an ideal time to initiate some structural redefinition of "aging" and "retirement" to prevent the cost of federal benefits from posing an intolerable burden on younger workers past the year 2010.

Aside from immediate budget savings, in the view of some members, a long-term redefinition of retirement benefits could be helped by delaying the retirement age and trimming the cost-of-living-allowances (COLAs) and/or initial benefit levels for many federal beneficiaries. Other members believe that there is adequate funding for the programs well into the next century, as noted above.

Also, if the idea is to encourage more of the senior members of the workforce to retire later, it makes sense to use positive as well as negative incentives. Hence some have proposed eliminating the Social Security "earnings test." Currently, Social Security benefits are reduced $1 for $3 in labor income over $10,200 earned by retirees age 65 through 69. The income impact of this reform is probably somewhat regressive (old myths to the contrary, it's the affluent who are most likely to want to keep working after age 65), but the "earnings test" is widely disliked among the young-old in their late 60s, even among those who are not much penalized by it. This reform has often been mentioned as a logical "sweetener" in any deal that would result in a significant benefit cut.

Net Interest Outlays

Like mandatory outlays, net interest payments are projected to grow rapidly in relation to GDP, from 3.2 percent to over 4.1 percent in 2001. Unlike entitlements, public policy cannot directly influence outlays. Such payments yield no benefits or services for the taxpayer. In effect, they are a waste of national resources. The federal government is adding debt at the rate of about $300 billion per year. Before the end of the century, the public debt of the United States will exceed $5 trillion and 62 percent of GDP, the highest level since the aftermath of World War II. Only by exercising discipline elsewhere in the budget will we limit the growth of net interest outlays. Such discipline has the dual benefit of both decreasing federal borrowing and keeping interest costs on other debt lower than would otherwise be the case.

Major Revenue Sources

Revenues are projected to rise by 4.7 percent during 1993 due to a strengthening of economic conditions, and then rise further from 18.5 percent to 18.8 percent of GDP in 1995. The CBO baseline anticipates that receipts will stabilize at this level through the early part of next century. This aggregate share of revenues is in line with recent historical experience. The average for 1960 to 1990 is 18.6 percent of GDP.

However, this number masks some important changes in the relative shares of different types of revenues. The share of total federal receipts contributed by corporations has fallen from about 20 percent to less than 10 percent. Similarly, the share contributed by excise taxes declined from 13 percent of total federal revenues to about 3 percent. By contrast, social insurance taxes (mainly payroll taxes) today contribute more than twice as much as they did in 1960: 38 percent compared with 16 percent. Finally, individual income taxes account for roughly the same proportion of total revenues, about 44 percent.[6] However, this number disguises the fact that the effective tax rate for the wealthiest 20 percent of the population declined by more than one percent, with the top percent of income earners enjoying a 5 percent lower rate than in 1979.[7]

The Subcouncil considered a wide range of revenue options. There was considerable agreement that some increase in taxation on upper-income earners and on energy were logical places to begin the search for increased revenues. With respect to energy taxation, the Subcouncil considered three basic alternatives:

▶ *An increase in the gasoline tax.* This would be simplest administratively, would dampen incentives for excessive driving and purchases of large cars, and would have disproportionately favorable effects in the financial markets and overseas by indicating a US willingness to finally begin moving toward world prices for gasoline. On the other hand, it would fall more heavily on lower income groups and residents of Western states who must drive long distances.

▶ *An ad valorem tax on the retail value of all forms of energy.* This is the most efficient alternative because it treats all forms of energy equally. It is more difficult to administer.

▶ *A tax on carbon content contained in each fossil fuel,* aimed at stabilizing US emissions of carbon dioxides over the next decade in order to limit further increases in global warming. The result would be increases in the after-tax price of coal, oil, and natural gas (with no increase for nuclear and hydroelectric power). A carbon tax would promote desirable environmental effects but would encourage energy forms that have problems of their own, such as nuclear, and would be quite difficult to administer.

The Subcouncil agreed that an oil import fee, while also able to raise considerable revenue, would be the worst type of energy tax. It would create windfall price rises for domestic producers without necessarily generating much more output, would hurt homeowners in the Northeast who rely on home heating oil, would hurt the competitive position of American industries (such as chemicals) that rely heavily on imports of refined oil, would be highly discriminatory internationally because of the presumed exceptions for Canada and Mexico due to NAFTA, and could have negative environmental effects.

Budget Deficit Reduction Options

The Subcouncil's deliberations over budget policy focused on the goal of balancing the consolidated budget within eight years. Based on its discussions, the Subcouncil believes that national savings and investment can be increased to a level which would make possible a doubling of the nation's annual rate of productivity growth. Furthermore, the Subcouncil believes that this task can be accomplished fairly, without demanding undue sacrifice from any individual segment of society (particularly the poor). It recognizes that such an endeavor will not be easy. However, the country has risen to the challenge of previous eras: recovery from the Depression, the defeat of fascism, the containment and disintegration of communism. In the post-Cold War era, the greatest challenge facing the country is the need to undertake the structural economic reforms necessary to preserve our relative economic strength and ensure rising living standards in a rapidly integrating world economy. With leadership, Americans will be no less equal to the challenge today than they were during the Depression, World War II, or the Cold War.

In its December 21, 1992 meeting, the Subcouncil reviewed the following illustrative list of budget deficit reduction options. The budget options are arranged in categories similar to the CBO budget functions. These categories, along with their share (in percent) of CBO baseline outlays in FY 1992 and 2001, are as follows:

	FY 1992	FY 2002
Defense discretionary	21.7	15.4
International discretionary	1.4	1.2
Domestic discretionary	15.4	12.8
Mandatory (entitlements)	51.1	58.2
Interest	14.3	16.9
Other	- 3.9	- 4.6
Revenues	NA	NA

Again, the CBO baseline currently projects a consolidated budget deficit of $310 billion for FY 1993 or 5 percent of GDP rising to 5.8 percent of GDP ($513 billion nominal) by 2001. It is estimated that initiatives recommended by the other CPC Subcouncils (see Table 2) will add $98 billion to this deficit by 2001, increasing it to roughly 6.8 percent of GDP.

The task at hand, then, is how to produce $408 billion (the FY 1993 deficit plus the current dollar equivalent of the $98 billion in new CPC-proposed spending) in outlay cuts or revenue hikes, relative to the baseline, by fiscal year 2001 and how to prevent the CBO-projected increase in the baseline deficit from 5 percent to 5.8 percent of GDP over the same period.

Each budget option presented below is followed by its projected savings for 2001. The timing or phasing-in of different budget options is not considered; the simple assumption is made that by 2001 each option is fully implemented.

Table 2

Summary of CPC-Recommended Initiatives with Significant Impact on the Federal Budget

	Billions of $ in FY 2001
TOTAL OUTLAY INCREASES	53.7
Infrastructure	26.4
National Highway System	14.4
Other Bridges	1.6
Intermodal	1.6
Mass Transit	0.8
Water/Environmental	8.0
R&D/Technology Programs	14.5
Civilian R&D	14.0
Technology Training & Extension	0.5
Worker Dislocation Assistance	3.2
Childhood Development & Education	9.6
Early Childhood Preparation	3.2
Headstart	4.8
Teacher Training	1.6
TOTAL REVENUE CUTS	43.9
Equipment Tax Credit	22.3
Lower Rates on Long-Term Capital Gains	6.3
R&D Business Tax Credit	6.0
R&D University & Consortia Credit	0.4
Individual Training Tax Deduction	4.5
Employer Training Tax Credit	3.4
Change Rule on Foreign-Source R&D	1.0
TOTAL ADDITIONS TO BASELINE DEFICIT	97.6

The appearance of any individual option on the list does not imply endorsement by either the full Subcouncil or any particular member. The list is illustrative. It is limited, first of all, to options for which reliable projections are available. (The majority of these have been calculated by the Congressional Budget Office; others, by the General Accounting

Office, the House Budget Committee, the Committee for Economic Development, the Brookings Institution, the National Taxpayers Union Foundation, the Committee for a Responsible Federal Budget, and Citizens for Tax Justice).

This list also does not include options that offer savings much less than $500 million; options that generate only one-time savings (e.g., asset sales); and options that vaguely invoke quantitative caps without indicating how the cap will be achieved. Most importantly, the options avoid strategies that would discourage private saving; reduce public investment in infrastructure, research, and education; or cut back on public assistance targeted primarily at the poor or near-poor.

Three clarifications are necessary. First, technically, the CBO offers only one overall baseline figure for discretionary spending after 1994; it does not break it down into defense, international, and domestic. The analysis is simplified by assuming that international and domestic spending grow at the same rate as the CPI after 1994 and that defense gets everything left over.

Second, outlays for "Net Interest" cannot be influenced by direct policy action. As explained below, savings in this function depend largely on how well deficit reduction has been accomplished elsewhere in the budget.

Third, since some of the options interact, the savings for different options are not always strictly additive.

Outlays

Defense Discretionary Outlays

The CBO "baseline" already projects a $49 billion real defense reduction between FY 1992 and FY 1995 (thereafter followed by no real-dollar change). The most-publicized new plans have proposed even bigger cuts. Compared to the CBO baseline for FY 1997 (in current dollars), for example: the FY 1993 Bush Budget comes in lower by $3 billion; the Clinton campaign plan, by $18 billion; the Aspin "C" plan, by $26 billion; the Kennedy plan, by $27 billion; the McCain plan, by $37 billion; the Aspin "B" plan, by $50 billion; the Aspin "A" plan by $65 billion; and the Brookings "Low Option" plan, by $89 billion.

For all such plans, the size of the spending cut ordinarily reflects the size of the manpower cut, since "force reductions" constitute the largest single source of savings. To illustrate, consider the Pentagon's current projection for the number of active-duty army divisions in 1995: 12 (2 under the Pacific command, 5 under the Atlantic command, and 5 under Contingency command). The Aspin "C Plan" would reduce the total to 9; his "B Plan" would reduce it to 8; and the Brookings "Low Option" plan would reduce it to 7. Aircraft carriers and their support vessels are especially expensive. The Pentagon currently wants to keep 12 carrier battle groups in 1995. The Brookings "Low Option and Aspin "A" plans would achieve considerable savings by cutting that total to 6.

In addition, costly weaponry is often a target. By FY 1997, cancelling the B-2 bomber and ending the program at its current complement of 15 planes (rather than the 75 originally planned) would save $4.6 billion. Halting the Department of Energy's construction, research, development, and testing of most new nuclear warheads would save $3.7 billion. Curtailing SDI (except for R&D and protection against short-range missiles) would save $4.0 billion. Terminating the Seawolf submarine would save $2.4 billion.

Table 3 outlines some of the key options advanced, with an indication of where each option would leave the defense budget as a share of GDP by the year 2001. Note that none of the published "plans" (except the Brookings plans) makes any spending projections beyond FY 1997. In all such cases, we assume constant real spending levels in all of the out-years.

International Discretionary Outlays

Despite its relatively small size ($20 billion total in 1992), the international affairs budget function is one of the first places politicians look to for cuts whenever the call for fiscal austerity is raised. At the 1990 budget summit, the Bush Administration deliberately insisted that it be made a separate category in order to prevent Congress from raiding it to spend money elsewhere.

Are savings possible here? Like defense, this budget function is tied up with diplomatic and security issues far removed from the nation's domestic economy. It may seem out of place to upset the fine balance of foreign assistance arrangements simply to save a few billion — especially since the turbulent post-Cold War diplomacy of the 1990s may require costly new initiatives. Still, aside from minor cuts, one idea might be considered: an across-the-board current-dollar freeze. In effect, this is what the Bush Administration proposed (in its FY 1993 Budget) for 1993 through 1997. The biggest dollar cuts would affect Israel and Egypt, who have been by far the largest foreign-aid beneficiaries since the Camp David Accord. The cuts would also affect the Food for Peace Program, the Export-Import Bank, and the Enterprise for the Americas program. If put into effect in 1994, this option would reduce the real value of international spending by nearly 25 percent by the year 2001. *(Budget savings in 2001: $6.0 billion)*

Table 3
Defense Discretionary Outlays

1. Maintain defense outlays at FY 1992 level as a share of GDP. Total outlays in 2001: 5.2 percent of GDP. **Budget savings in 2001:**	**-$145 billion**
2. Maintain defense outlays at FY 1992 level in real dollars. Total outlays in 2001: 4.2 percent of GDP. **Budget savings in 2001:**	**-$53 billion**
3. President Bush's 1992 Budget Plan. Total outlays by 2001: 3.7 percent of GDP. **Budget savings in 2001:**	**-$1 billion**
4. President Bush's 1993 Budget Plan. Total outlays by 2001: 3.5 percent of GDP. **Budget savings in 2001:**	**+$17 billion**
5. President-Elect Clinton's Campaign Plan. Total outlays by 2001: 3.3 percent of GDP. **Budget savings in 2001:**	**+$30 billion**
6. The "Aspin One" (Force C) Plan. Total outlays by 2001: 3.2 percent of GDP. **Budget savings in 2001:**	**+$45 billion**
7. The "Aspin Two" (Force B) Plan. Total outlays by 2001: 2.9 percent of GDP. **Budget savings in 2001:**	**+$73 billion**
8. The Brookings "Intermediate" Plan. Total outlays by 2001: 2.8 percent of GDP. **Budget savings in 2001:**	**+$80 billion**
9. The Brookings "Low Level" Plan. Total outlays by 2001: 2.4 percent of GDP. **Budget savings in 2001:**	**+$122 billion**

Domestic Discretionary Outlays

The list below includes both a single big target reduction in domestic discretionary outlays and a selection from among the thousands of line items in the budget. On the one hand, these specific cuts can be viewed as "illustrative" savings that could achieve the overall target. (If all of them were enacted, the specific cuts would generate a total saving of well over $20 billion by 2001.) Alternatively, they can be viewed as entirely separate from the concept of an overall target, each to be accepted or rejected on its own merits. In each case, the figure noted is its positive impact on the budget balance. We did not specify whether technically it would achieve the savings through a reduction in outlays, an increase in "negative outlays," or an increase in revenues.

By design, none of the specific cuts has a disproportionate impact on low-income households; in fact, most of them (especially the "user fees") have a progressive impact. Also by design, none of them reduces spending on infrastructure or (aside from health) on research. This is not to imply that all federal social service or investment or research programs are perfect. Far from it. Many could be thoroughly overhauled. It is simply to stress that if our goal is to protect the poor and reallocate federal spending toward the future, we should not begin our search for cuts in those areas.

1. *Five-Percent Real Cut in Current Programs.* This means that some combination of discretionary spending programs would be cut back or eliminated so that total domestic discretionary spending in 2001 would be 5 percent less (in 1992 dollars) than it is in 1992. This 5 percent cut would not encompass the new spending initiatives proposed by the other CPC Subcouncils. This cut is phased in over the full 8 years and does not become fully effective until 2001. *(Budget savings in 2001: $14.3 billion)*

2. *Agency Overhead Cut.* This option would cut the administrative outlays of all federal agencies by 1 percent of their domestic discretionary budgets. *(Budget savings in 2001: $3.4 billion)*

3. *Federal Pay Freeze.* This option would eliminate civilian pay raises for one year and delay the subsequent yearly adjustment date by three months. *(Budget savings in 2001: $2.7 billion)*

4. *User Fees for Transportation Services.* This option would require the FAA to auction take-off and landing-slots at congested airports and to charge private aircraft users for the full marginal cost of the air traffic control system it runs on their behalf. It would require similar fees to be charged to users of inland waterways maintained by the Corps of Engineers. *(Budget savings in 2001: $2.7 billion)*

5. *Shift Hospital Reimbursement for both Federal Employees and VA Patients to a Prospective Payment System.* This option would require the Federal Employees Health Benefit system to reimburse hospital according to prospective Diagnosis Related Groups (similar to those now used for Medicare), rather than according to fee-for-service or group discounts. This system has already been successfully introduced for military dependents and retirees. It would allocate resources to VA hospitals on a similar basis. Prospective payment puts a cap on total health costs and creates incentives for health-care resources to be allocated with greater efficiency. *(Budget savings in 2001: $2.2 billion)*

6. *Impose a Royalty Payment on Users of the Radio Spectrum.* This option would require the FCC to auction off scarce portions of the radio spectrum. *(Budget savings in 2001: $2.2 billion)*

7. *Reduce Research Supported by the National Institute of Health.* Between 1981 and 1991, NIH research funding rose by about 128 percent. This option would cut research funding by 10 percent—forcing the health-care research community (and perhaps the health-care industry) to focus more on cost-effectiveness. *(Budget savings in 2001: $1.1 billion)*

8. *Eliminate Funding to School Districts for Impact Aid.* Impact Aid compensates school districts with parents who live and work on federal (and thus tax-exempt) property. Most of the families helped have higher-than-average incomes. *(Budget savings in 2001: $1.0 billion)*

9. *Reduce Overhead Rate on Federally-Sponsored University Research.* In recent years, the overhead administrative costs charged by universities engaged in federally-funded research have been growing rapidly. Currently, only HHS (which funds about half of all federal research) places a strict cap on overhead costs. That cap is 26 percent of so-called modified direct costs. This option would apply a 20 percent cap on all research. *(Budget savings in 2001: $0.9 billion)*

10. *End Small Business Administration Loans and Loan Guarantees.* The

argument long made against SBA loans is that only a very small percentage of small businesses apply, that eligibility depends on highly political criteria, and that the high default rate suggests that many of the loans should never have been made in the first place. *(Budget savings in 2001: $0.8 billion)*

11. *Charge User Fees for Coast Guard Services.* Charge commercial and pleasure boats to recover the full cost of services provided to them by the Coast Guard. *(Budget savings in 2001: $0.8 billion)*

12. *Raise User Fees for Federal Land Use.* Raise user fees for hardrock mining, grazing, water, and recreation to more closely reflect cost; deduct program costs before allocating a fixed share of government revenue from federal land to states and counties. *(Budget savings in 2001: $0.6 billion)*

13. *Close or Convert Underused VA Facilities and Shift VA Hospitals to a Prospective Payment System.* This option would not deny services currently offered to veterans, but would close down underused or inefficient facilities. *(Budget savings in 2001: $0.5 billion)*

14. *Eliminate the Subsidy to REA loans and to DOE-financed Hydroelectric Power.* The Rural Electrification Administration's loan subsidy program, first instituted in the 1930s, has long outlived its original purpose; and even without the Department of Energy's subsidy, the cost of federally-financed hydroelectric power in the Northwest would remain far below the national average. *(Budget savings in 2001: $0.5 billion)*

15. *Discontinue Postal Subsidies for Not-for-Profit Organizations.* This option would avoid having taxpayers subsidize mail for all non-profits. *(Budget savings in 2001: $0.4 billion)*

16. *User Fees for National Parks and Forests.* Charge users to recover full cost of recreation facilities run by the National Park Service and the Forest Service. *(Budget savings in 2001: $0.4 billion)*

17. *User Fees for Harbors.* Increase Harbor Maintenance Tax to cover the full cost of running and maintaining harbors. *(Budget savings in 2001: $0.4 billion)*

18. *Reduce Federal Support for TVA Activities.* Basically, this option would stop subsidizing nonessential TVA activities (e.g., recreational facilities) and require the purchasers of TVA power or states and local governments to cover the cost of TVA's land use activities. *(Budget savings in 2001: $0.2 billion)*

Mandatory Outlays — Health

Two sets of options are provided below. The first set lays out various cost-reducing options, including one (the first option) which is simply an assumption about how much the growth rate in national per-capita health spending will decline below the CBO baseline. Presumably, this decline may occur partly in response to the other cost-reducing options, by giving patients, providers, and insurers more of an incentive to be cost-conscious. It may also occur in response to other public policies — from technology certification to regional cost boards to tort law reform to an outright capitation of reimbursement rates. Without assuming some moderation in per-capita health-care consumption (public and private), it is very hard to make a deficit reduction plan work. The estimates for all other options assume that this option is achieved.

The second set lays out various access-expanding options, all designed to bring some measure of basic health coverage to most Americans who are currently uninsured. All will generate an increase in the projected federal deficit — which must be covered either by a new earmarked tax source or by compensating tax hikes or revenue cuts in other parts of the budget. The magnitude of this increase, however, diverges widely among different options, not so much due to the generosity of the benefit offered as to whether the private sector (mandated benefits) or public sector (universal health insurance) bears most of the cost burden.

Cost Reduction Options

1. *Global Health Outlay Growth Decline.* Assuming the introduction of comprehensive and effective health-care cost control measures, this "option" assumes a gradual decline in the rate of growth of federal health-care outlays. Specifically, from 1994 on, we expect that the growth rate will fall by one-quarter of a percent per year. By 2001, the growth rate will be two full percentage points under baseline for both Medicare and Medicaid. (For private health-care spending, this option assumes a more modest drop of one-eighth of a percent per year.) *(Budget savings in 2001: $46.3 billion)*

2. *Partial Means-Testing of Medicare.* This option would employ a "benefits withholding" formula on the insurance value of HI and SMI (net of premiums) and would be implemented through the tax code. No household under $30,000 would be affected. Above $30,000, 7.5 percent of the benefit would be taxed away, and an additional 5.0 percent would be taxed away for every $10,000 in additional household income. The marginal withholding rate would reach a maximum of 85 percent for households at or above $190,000. All income thresholds would be indexed for inflation. *(Budget savings in 2001: (est.) $18 billion)*

3. *SMI Premium Hike to 30 Percent of Cost.* Back when Medicare was first enacted, the monthly premium for Supplementary Medical Insurance (Medicare, Part B) was set to cover 50 percent of all SMI benefit costs. Since the early 1970s, the premium has fallen behind benefit growth and now covers only about 25 percent of all costs. This option would raise the premium back to 30 percent. *(Budget savings in 2001: $10.6 billion)*

4. *SMI Premium Hike to 50 Percent of Cost.* Same as above, but this option would raise SMI premiums all the way back to 50 percent of SMI benefit costs. *(Budget savings in 2001: (est.) $50 billion)*

5. *Income-Adjusted SMI Premium Hike.* This option would leave the SMI premium unchanged (at 25 percent of benefit cost) for beneficiaries with adjusted gross incomes of less than $50,000 (singles) or $65,000 (couples). The premiums would progressively rise to 50 percent of benefit cost for beneficiaries with AGIs of more than $60,000 (singles) and $80,000 (couples). *(Budget savings in 2001: $6.3 billion)*

6. *SMI Deductible Hike.* Raise the yearly SMI deductible from $100 to $150 in today's dollars and index it thereafter to SMI charges per enrollee. This would still leave enrollees with a considerably smaller deductible, relative to their annual charges, than they paid twenty years ago. *(Budget savings in 2001: $5.9 billion)*

7. *SMI Uniform Coinsurance Rate.* On most services, the SMI coinsurance rate is currently 20 percent. This option would raise the rate to 25 percent. It would also make that rate applicable to certain SMI services (such as clinical laboratory services, home health, and skilled nursing care) that now require no coinsurance. *(Budget savings in 2001: $12.5 billion)*

8. *Eliminate HI's "Disproportionate Share Adjustment."* Currently, Hospital Insurance (Medicare, Part B) pays higher reimbursement rates to hospitals with a disproportionate number of low-income Medicare patients, though it has never been fully demonstrated that such patients are costly to treat. This option would eliminate this extra payment. *(Budget savings in 2001: $4.3 billion)*

9. *Freeze Medicare's Reimbursement Rates for One Year.* Ever since 1984, HI has reimbursed hospitals for inpatient services according to a schedule of Diagnostic Related Groups (DRGs) that are increased each year according to changes in national hospital costs. Starting in 1992, SMI will reimburse physicians according to a service fee schedule that is increased each year according to a Medicare Economic Index. This option would freeze both schedules for one year. *(Budget savings in 2001: $5.4 billion)*

Access Expansion Options

10. *Individual-Mandated Benefits Funded by Taxing Employer-Paid Health Care.* This is the American Enterprise Institute/Heritage Foundation proposal. It would require all citizens to purchase basic health insurance (either directly or through their employers). It would also repeal the tax exclusion for employer-paid health care and use the revenue to fund a tax credit that would buy basic coverage for anyone who cannot now afford it. It is uncertain how many of the currently uninsured would receive coverage under this option. *[Although the plan is "self-financing," it would of course eliminate the $60 billion employer health care tax exclusion as a potential source of new revenue—see below.]*

11. *Employer Mandated Benefits Combined with Medicaid Expansion.* This is the CBO plan (1991). It would (a) require all employers with 25 or more employees to purchase health insurance for their workers (who may be charged for up to 25 percent of the cost of such insurance); (b) raise the eligibility for Medicaid to 100 percent of the poverty level in every state; and (c) allow households between 100 and 200 percent of the poverty level to "buy in" to Medicaid on a sliding scale. This program would make special risk pools available to smaller businesses and might (if necessary) be combined with a special "pay or play" trust fund.

CBO estimates that its program would end up covering roughly 85 percent of all Americans who are currently uninsured. This option would raise the deficit through higher Medicaid outlays and lower tax revenues (since nontaxable health insurance would, to some extent, replace taxable earnings or profits). But it would also generate some savings in Medicare. *(Budget savings in 2001: -$29.3 billion)*

12. *Pay or Play.* This option would require employers either to provide health coverage for their workers or pay into a government fund (at an assumed rate of 10 percent of payroll) to pay for public coverage. An additional program would cover all individuals unconnected to employers. The critical issue in any pay-or-play plan is where to set the payroll tax: too high and it becomes just like mandated benefits, with little new revenue for unconnected individuals; too low and it turns into a giant new public benefits program, possibly in need of large additional funding from other revenue sources. *(Budget savings in 2001: (est.) -$150 billion) [not counting "pay" revenue]*

13. *Universal Medicare.* This option would expand Medicare to cover the entire population, keeping the premiums, co-payments, and deductibles the same as in the current Medicare system. *(Budget savings in 2001: (est.) -$535 billion)*

14. *Comprehensive National Health Insurance.* This option (like the Canadian system) is similar to universal Medicare — but without the premiums, co-payments, or deductibles. *(Budget savings in 2001: (est.) -$840 billion)*

Mandatory Outlays — Non-Health

Social Security and federal pension benefits are the big-ticket non-health entitlement programs. Options for reducing the deficit in this area include:

1. *Faster Rise in the Social Security (OASI) Retirement Age.* Since Social Security started paying out retirement benefits, the average US life expectancy at age 65 has grown by seven years. By the year 2020, it will have grown by ten years — more than doubling the average duration of retirement after age 65. What's more, never before have Americans in their 60s been so healthy or had so much to contribute to the economy. Yet through it all the official retirement age has not budged. Indeed, a growing share of Americans (today, nearly two-thirds) are taking advantage of "early retirement" with reduced benefits at age 62. The 1983 Social Security Reform Act made a tentative step to reverse this trend by raising the OASI retirement age, starting in 2000, by 2 months per year — until a new retirement age of 67 is established in 2022.

This option would accelerate this process by (a) beginning it in 1994,

(b) raising the retirement age by 3 months per year, and (c) establishing a new retirement age of 68 in 2006 (with "early retirement" rising in tandem to age 65). The budget savings would accrue through lower benefit outlays and through higher receipts from income and payroll taxes. (They would also continue to grow faster than GDP through the year 2006.) *(Budget savings in 2001: $26.2 billion)*

2. *Partial Means-Testing of All Cash Benefits.* This option would employ a "benefits withholding" formula to all cash benefits received from the federal government and would be implemented through the tax code. No household under $30,000 would be affected. Above $30,000, 7.5 percent of the benefit would be taxed away, and an additional 5.0 percent would be taxed away for every $10,000 in additional household income. For Civil Service and Military pensioners, the marginal withholding rate would reach a maximum of 25 percent for households at or above $70,000. For all other beneficiaries, it would reach a maximum of 85 percent for households at or above $190,000. All income thresholds would be indexed for inflation. *(Budget savings in 2001: (est.) $63 billion)*

3. *Eliminate COLA for One Year on All Non-Means-Tested Cash Benefits.* Given the CBO baseline CPI, this would mean a 3.3 percent one-year loss in the real value of all benefits to current beneficiaries. The savings for this option are calculated net of a small increase in means-tested outlays. In the out-years, these savings would gradually disappear. *(Budget savings in 2001: (est.) $10 billion)*

4. *Limit COLA to Two-Thirds of CPI for Five Years on All Non-Means-Tested Cash Benefits.* Given the CBO baseline CPI, this option would mean a cumulative 5.6 percent five-year loss in the real value of all benefits to current beneficiaries. The savings for this option are calculated net of a small increase in means-tested outlays. In the out-years, these savings would gradually disappear. *(Budget savings in 2001: (est.) $17 billion)*

5. *Two-Tiered COLA Limitation for Social Security and Railroad Retirement for Five Years.* This option would grant a 100-percent-of-CPI COLA to the first tier of all Social Security and Railroad Retirement Benefits (today about $600 per month, or close to the poverty threshold) and a 50-percent-of-CPI COLA to all additional benefits. Because the size of retirement benefits are only mildly correlated with current household income, this option would not protect many low-income retirees (nor reduce benefits to many high-income retirees). The savings for this option are calculated net of a small increase in means-tested outlays. In the out-years, these savings would gradually disappear. *(Budget savings in 2001: (est.) $4 billion)*

6. *Limit COLA to CPI Minus One-Half Percent for Eight Years, and Revise Initial Benefit Formula, for All Non-Means Tested Cash Entitlements.* This option would entail a cumulative 4.0 percent eight-year loss in the real value of all benefits to current beneficiaries. Meanwhile, the initial benefit formula for these programs (primarily OASDI, Railroad Retirement, and Military, Civil Service, and Veterans Pensions) would be gradually reduced by the same percentage. Unlike the other COLA options, there would be no disparity between "old" and "new" benefits. Also unlike the other COLA options, the savings would continue in the out-years. *(Budget savings in 2001: (est.) $23.0 billion)*

7. *Federal Pensions: Defer COLAs Before Age 62.* This option (already in effect for "new" federal workers, most of whom won't be retiring for many years to come) would eliminate COLAs to all retirees before age 62, but then allow a "catch-up" adjustment at age 62. *(Budget savings in 2001: $3.2 billion)*

8. *Federal Pensions: Extend the Salary Base.* Currently, Civil Service and Military retirees calculate initial benefits on the basis of an employee's three highest salaried years. This option would extend the base to four years. *(Budget savings in 2001: (est.) $1 billion)*

9. *Federal Pensions: Limit COLAs.* This option would reduce the COLA to the CPI minus 1 percent for "old" Military retirees (entered service before 1984) and to CPI minus ½ percent for "old" Civil Service retirees (entered service before August 1, 1987). *(Budget savings in 2001: (est.) $4 billion)*

10. *Federal Pensions: Limit Federal Contributions to FERS Thrift Plans.* Under the new "Federal Employment Retirement System" (FERS, for "new" Civil Service employees), the government will match any employee contribution to a Thrift Savings Plan, dollar for dollar, up to five percent of pay. This option would reduce the matching payment to 50 cents on the dollar. Upper-income employees would be most affected. *(Budget savings in 2001: $0.6 billion)*

11. *Veterans' Compensation Reform.* This is the CBO plan, which would end cash benefits to veterans, or the dependents of veterans, with low-rated disabilities. Such disabilities (rated below 30 percent) include conditions such as mild arthritis, flat feet, or amputation of part of a finger — conditions not likely to affect the ability of most veterans to work in today's workplace. The plan would also end benefits to new veterans with disabilities neither incurred nor aggravated while performing military duties. *(Budget savings in 2001: $2.9 billion)*

12. *Reduction in Farm Aid.* Reduce the federal target price for federal "deficiency payments" to farmers by 15 percent over eight years. *(Budget savings in 2001: $7.3 billion)*

13. *Eliminate Certain Agricultural Subsidies.* This option would phase out the dairy program, the honey program, the wool and mohair subsidies, the Market Promotion (export) Program, and the Export Enhancement Program. *(Budget savings in 2001: $1.5 billion)*

14. *Eliminate the Federal Crop Insurance Program.* Through the Federal Crop Insurance Corporation, farmers are eligible for highly-subsidized insurance protection in case of crop loss. Less than half of all farmers sign up for it, however, since most farmers expect to be protected by disaster assistance in case of severe losses. Instead, most of the FCIC's benefits go to subsidizing farmers with only mild losses. This option would eliminate the FCIC and replace it with standing authority for disaster relief. *(Budget savings in 2001: $0.7 billion)*

15. *Expand Supplemental Security Income.* The Supplemental Security Income program provides means-tested benefits to the elderly and disabled poor. Currently, the maximum SSI payment is equivalent to only about 75 percent of the poverty line. This option would raise it to 100 percent of the poverty. Currently, a non-disabled person must be age 65 or over to qualify for benefits; this option (to provide better protection as the age of Social Security's early retirement grows) would provide benefits at age 62 or over. Also, this option would allow for an indexing of the "assets test" used to screen applicants. *(Budget savings in 2001: -$22.8 billion)*

Net Interest Outlays

"Net Interest" is always a dependent variable. It is dependent, first, on the rate at which future deficits enlarge the size of the publicly-held national debt; and second, on the average interest rate. In this case, it does matter in 2001 how fast the budget approached balance in the years prior to 2001. But the following two scenarios (they aren't really options) assume that the path toward deficit reduction between 1993 and 2001 is roughly linear.

1. *No Interest Rate Response.* In this scenario, we assume (very conservatively) that average interest rates on the federal debt will stay at their CBO baseline level in 2001 (6.7 percent) regardless of any progress in narrowing the deficit. If so, then 2001 savings in net interest outlays will be equal to roughly 20 *percent* of the reduction in the 2001 deficit not including net interest.

2. *Favorable Interest Rate Response.* In this scenario, we assume (more

reasonably) that average interest rates on the federal debt will gradually decline by one full percentage point between 1993 and 2001 in response to substantial progress in (and expectations of) narrowing the deficit. If so, then 2001 savings in net interest outlays will be equal to roughly 35 *percent* of the reduction in the 2001 deficit not including net interest.

Revenues

We group revenue options according to the following categories: limits on household tax expenditures; changes in income and payroll taxes; consumption taxes; and energy taxes.

In the first two categories, all of the options are progressive in their impact on household income. Some, to be sure, are more progressive than others. Among tax expenditure cuts, the taxation of Social Security without thresholds is only barely progressive—primarily because half of these benefits are already taxable for upper-income households. On the other hand, the tax expenditure cuts for home mortgage interest, for all itemized deductions, and for state and local taxes are quite progressive. All of the income tax changes are progressive—most notably the option that would raise only the top bracket and would create a new "super-rate" for the top one percent of all taxpayers.

With respect to consumption and energy taxation, all of the options are either about neutral or somewhat regressive—at least according to the standard "snapshot" definition of the income distribution. Note that some VATs (Option 37) are more regressive than others (Option 39). In theory, it might be possible to design a "progressive" VAT or energy tax by allowing consumers to take a credit against tax payments on their income tax form. It also might be possible to create a progressive consumption tax that could be administered entirely through the income tax system (e.g., the Nunn-Domenici "Consumption-Based Income Tax"). However, practical versions of these ideas with quantitative projections are not yet available.

In all of the following proposals, it is assumed that income thresholds are indexed for inflation.

Limits on Household Tax Expenditures

1. *Tax 85 Percent of Social Security Benefits With Thresholds.* Currently, 50 percent of Social Security and Railroad Retirement benefits are taxed for households with incomes over $25,000 (singles) or $32,000 (couples). This option would raise the proportion to 85 percent. (The rationale is that 15 percent of benefits represents worker's contributions that have already been taxed; however, the true figure for today's retirees is closer to 6 percent.) *(Deficit reduction by 2001: $9.5 billion)*

2. *Tax 85 Percent of Social Security Benefits Without Thresholds.* Same as previous option, but get rid of the thresholds and treat 85 percent of all benefits no differently than any other type of taxable income. *(Deficit reduction by 2001: $33.4 billion)*

3. *Tax 50 Percent of the Insurance Value of Medicare With Thresholds.* This option would impute half of the per-capita cost of both HI and SMI (net of personal premiums) as taxable income to beneficiaries. It would also apply the same "income thresholds" as currently apply to the taxation of Social Security benefits. *(Deficit reduction by 2001: $11.4 billion)*

4. *Tax 50 Percent of the Insurance Value of Medicare Without Thresholds.* Same as previous option, but get rid of the thresholds. *(Deficit reduction by 2001: $20.7 billion)*

5. *Tax the Portion of Workers' Compensation and Black Lung Benefits that Represent Lost Earnings.* This option would treat benefits as taxable if they represent the replacement of wages or salary lost from work-related injuries or disabilities. This would make the tax treatment of such benefits consistent with the tax treatment of Unemployment Insurance or of private-sector sick pay and

disability pensions. *(Deficit reduction by 2001: $4.9 billion)*

6. *Cap the Tax Exclusion for Employer-Paid Health Insurance.* This option would cap the employer-health exclusion to $335 per month for family coverage and $135 per month for individual coverage. Any employer-paid health insurance over these caps would be treated as taxable income to the household. The caps would be indexed to the CPI. *(Deficit reduction by 2001: $36.9 billion)*

7. *Eliminate the Home Mortgage Interest Deduction. (Deficit reduction by 2001: $71.2 billion)*

8. *Limit the Home Mortgage Interest Deduction.* This option would limit the tax rate at which home mortgage interest is deductible to 15 percent. *(Deficit reduction by 2001: $23.3 billion)*

9. *Limit All Itemized Deductions.* This option would limit the tax rate at which all itemized categories are deductible to 15 percent. Currently, one quarter of all taxpayers itemize. This option would affect roughly half of those—or, generally speaking, the most affluent one-eighth of all taxpayers. *(Deficit reduction by 2001: $96.5 billion)*

10. *Cap the Deductibility of State and Local Taxes.* This option would limit the deductibility of state and local taxes to 9 percent of Adjusted Gross Income. *(Deficit reduction by 2001: $9.0 billion)*

Changes in Income and Payroll Taxes

11. *Raise All Marginal Tax Rates.* This option would raise the marginal tax rate structure by roughly 7 percent on all brackets—from 15, 28, and 31 percent (current law) to 16, 30, and 33 percent. *(Deficit reduction by 2001: $49.8 billion)*

12. *Raise Top Two Marginal Tax Brackets.* This option would leave the 15 percent bracket alone, but would raise the marginal tax rate on the top two brackets to 30 and 33 percent. Only people with taxable incomes over $22,100 (singles) and $36,950 (couples) would be affected. *(Deficit reduction by 2001: $25.0 billion)*

13. *Raise Only the Top Marginal Tax Bracket.* This option would raise only the top bracket from 31 to 33 percent. Only people with taxable incomes over $53,550 (singles) and $89,250 (couples) would be affected. *(Deficit reduction by 2001: $9.0 billion)*

14. *Raise Top Marginal Tax Bracket and Add a New Bracket.* Same as the previous option—but with a new bracket of 38 percent added for people with taxable incomes over $75,000 (singles) and $125,000 (couples). *(Deficit reduction by 2001: $26.6 billion)*

15. *Impose a 5 Percent Surtax.* This option would impose a 5 percent additional tax on tax liability after credits—including capital gains and the alternative minimum tax. *(Deficit reduction by 2001: $38.2 billion)*

16. *Impose a 10 Percent Surtax on Taxable Income Above $500,000 and an Additional 10 Percent Surtax on Income Above $1 Million. (Five year deficit reduction: $25 billion)*

17. *Raise the Alternative Minimum Tax.* This option would raise the AMT rate for individuals from 24 to 28 percent. *(Deficit reduction by 2001: $11.2 billion)*

18. *Eliminate "Stepping Up" at Death.* Current law allows the tax basis of inherited assets to be "stepped up" — tax free — to the time of the previous owner's death. This option would make capital gains taxable upon death. *(Deficit reduction by 2001: $6.4 billion)*

19. *Increase Top Corporate Income Tax Rate to 36 Percent and Add a 10 Percent Surtax on Tax Attributable to Taxable Income Above $1 Million. (Five year deficit reduction: $66 billion)*

20. *Impose a 5 Percent Surtax on Corporations.* This option would impose a 5 percent additional tax on tax liability after credits — including the alternative minimum tax. *(Deficit reduction by 2001: $7.7 billion)*

21. *Repeal the Medicare Max Tax.* Currently, the HI FICA tax (employer and employee shares combined) is 1.45 percent on annual earnings up to $130,200. This option would remove the cap and apply the tax to all earnings. Roughly the same amount of revenue could raised (less progressively) by keeping the cap and raising the rate from 1.45 to 1.55. *(Deficit reduction by 2001: $8.6 billion)*

22. *Reduce the Business Lunch Deduction.* This option would reduce the business deduction for meals, entertainment, and travel from 80 percent to 50 percent. *(Deficit reduction by 2001: $4.4 billion)*

23. *Tax Capital Gains the Same as Other Income.* An important accomplishment of the 1986 Tax Reform Act was to tax capital gains at the same rates as wages, dividend or other income. (Previously, capital gains had been 60 percent tax-exempt.) In 1990, Congress reinstated a relatively small capital gains preference, capping the rate at 28 percent while putting the top regular income tax rate at 31 percent. This option would eliminate this preference. *(Five year deficit reduction: $22 billion)*

24. *Tax Capital Gains on Inherited Property.* Currently, heirs can sell inherited property and pay no tax on gains that accrued prior to the time they inherit. Treasury analysts estimate that as much as two-thirds of all capital gains escape taxation entirely due to this loophole — which will cost $27 billion in FY 1992 and close to $150 billion from FY 1992 to FY 1996. Under this option, these built-up capital gains would be subject to tax at the time of inheritance. (Exceptions could be made for farms and closely-held businesses by delaying the tax until inherited property is sold.) *(Five year deficit reduction: $17 billion. Later years would be much higher.)*

25. *Reform Estate and Gift Taxes.* Estate and gift taxes (which apply to the very largest estates) can often be avoided through trusts, partial-interest gifts and other complex arrangements. This option would curb tax avoidance schemes in this area. *(Five year deficit reduction: $8 billion)*

26. *Curb Certain Accelerated Depreciation Write-offs.* Businesses write off the cost of their equipment considerably faster than it actually wears out. This tax advantage — expanded in the 1986 Tax Reform Act — has proven much more expensive than originally anticipated; it is now estimated to cost $144 billion from FY 1992 to FY 1996. This option would scale back equipment depreciation write-offs to better reflect real wear and tear and obsolescence. *(Five year deficit reduction: $24 billion)*

27. *Curb Tax Breaks for Financing of Mergers and Acquisitions.* The deductibility of corporate interest payments, even in the case of "junk bonds" and other types of debt that are more like stocks than borrowings, helped fuel a wave of leveraged buyouts and other debt-for-stock transactions in the 1980s. From 1985 to 1990, more than $1 trillion in new corporate indebtedness was incurred, accompanied by $54 billion in corporate stock retirements, which now deprives the federal Treasury of an estimated $20 billion to $30 billion a year in revenue. In addition, many companies which made acquisitions in the 1980s have taken aggressive approaches to writing off "goodwill" and similar intangible assets. This option would curb the interest deduction on debt incurred to purchase stock in excess of $5 million as well as the deduction for "goodwill." *(Five year deficit reduction: $9 billion)*

28. *Reform Taxation of Multinational Corporation Activities.* A May 1992 Congressional Budget Office report found that "[i]ncreasingly aggressive transfer pricing by . . . multinational corporations" may be one source of the shortfall in corporate tax payments in recent years compared to what was predicted after the 1986 Tax Reform Act. This option would reform the complex "transfer pricing" rules which govern allocation of income among a multinational corporation's global facilities by allocating profits based on the share of a company's worldwide sales, assets

and payroll in the United States. *(Five year deficit reduction: $23 billion)*

29. *Limit Meals and Entertainment Deductions to 50 Percent.* Currently, 80 percent of business meals and entertainment expenses are deductible — a subsidy that is estimated to cost $10 billion per year. This option would reduce the deductible proportion of such expenses to 50 percent. *(Five year deficit reduction: $16 billion)*

30. *Curb Certain Tax Advantages of Foreign Subsidiaries.* Current tax rules allow companies to defer indefinitely US taxes on unrepatriated income earned by foreign subsidiaries and allow companies to use foreign tax credits for taxes paid to non-tax-haven countries to offset US tax due on repatriated profits generated in a low- or no-tax foreign tax haven. This option would curb this tax treatment, which some Subcouncil participants argued encourages companies to move business activity overseas. *(Five year deficit reduction: $1 billion)*

31. *Curb Oil and Gas Tax Advantages.* Oil and gas companies are permitted to write off many of their capital costs immediately, and many can take deductions for so-called "percentage depletion" which often has no relationship with actual incurred expenses. This option would repeal these tax preferences. *(Five year deficit reduction: $9 billion)*

32. *Curb Certain Farm Tax Preferences.* Unlike most other types of "tax shelter" losses, farm "losses" can often be deducted against non-farm income if a lenient "material participation" condition is met. This option would eliminate this practice. *(Five year deficit reduction: $7 billion)*

33. *Tax Real Estate Like-Kind Exchanges.* Currently, someone wishing to sell business real estate can put off paying capital gains taxes indefinitely by "exchanging" the property for other real estate. This option would eliminate tax deferral for these "like-kind exchanges." *(Five year deficit reduction: $2 billion)*

34. *Curb Real Estate Refinancing Deferral.* Owners of business real estate can cash in their capital gains without paying taxes by refinancing their properties. This is a considerable tax shelter for wealthy real estate speculators in particular. This option would establish a rule that if real estate is refinanced for more than its original purchase price, the excess would be subject to taxation. *(Five year deficit reduction: $4 billion)*

35. *Conform Book and Tax Accounting for Securities Inventories. (Five year deficit reduction: $2 billion)*

36. *Tax Foreigners' Interest Income at 5 Percent.* Interest earned by foreigners in the US (on loans to American companies and the US government) was exempted from US tax in 1984. Often, this income is not reported to foreigners' home governments either. As a result, the United States has become something of an international tax haven. This option would impose a five percent tax on interest earned in the US by foreigners. The tax could be waived if a foreign lender supplies the information necessary to report the interest income to the foreign home government. *(Five year deficit reduction: $13 billion)*

Consumption Taxes

37. *Impose a 5 Percent Value-Added Tax With a Restricted Base.* This option would establish a VAT of 5 percent on a consumption base that would exclude certain expenditure categories — most importantly, housing, medical care, financial services, religious and welfare activities, local transit, and private education and research. *(Deficit reduction by 2001: $94.0 billion)*

38. *Impose a 5 Percent Value-Added Tax With a Less Restricted Base.* Same as above, but include health care in the taxable base. *(Deficit reduction by 2001: $115.4 billion)*

39. *Impose a 5 Percent Value-Added Tax With a Comprehensive Base.* Here, the 5 percent VAT would be applied to the most comprehensive base possible. It would exclude only housing and religious and welfare

activities. *(Deficit reduction by 2001: $178.6 billion)*

40. *Raise the Federal "Sin" Taxes.* This option would double the federal excise on cigarettes, raise the excise on alcoholic beverages to $16.00 per proof gallon, and index both rates for future inflation. *(Deficit reduction by 2001: $12.5 billion)*

Energy Taxes

41. *Impose a $5 per Barrel Oil Import Fee.* This option would impose an excise tax of $5 per barrel on crude petroleum and refined petroleum—imports only. *(Deficit reduction by 2001: $14.9 billion)*

42. *Impose a $5 per Barrel Oil Tax.* This option would impose an excise tax of $5 per barrel on crude petroleum and refined petroleum products, both domestically produced and imported. *(Deficit reduction by 2001: $28.9 billion)*

43. *Increase the Gas Tax by 50 cents per Gallon.* This option would increase the federal motor fuels excise tax (currently 14.1 cents per gallon of gasoline and 20.1 cents per gallon of diesel) to 64.1 and 70.1 cents, respectively. *(Deficit reduction by 2001: $56.7 billion)*

44. *Impose a 10 Percent Energy Tax.* This option would impose a 10 percent ad valorem tax to the retail value of most forms of energy: including coal, petroleum, natural gas, hydroelectricity, and nuclear power. *(Deficit reduction by 2001: $46.2 billion)*

45. *Impose a CO_2 Stabilization Tax.* This option would impose a tax on the CO_2 emissions content of various fossil fuels (primarily coal, oil, and natural gas). To stabilize US CO_2 emissions over the next decade, it is estimated that the tax rate would have to be about $30 (in 1993 dollars) per ton of carbon content. This would raise the after-tax price of coal by 50 percent and of oil and natural gas by 10 percent. *(Deficit reduction by 2001: $47.6 billion)*

46. *Impose a CO_2 Reduction Tax.* Same as above, only here the target would be to reduce total CO_2 emissions by 10 percent by the year 2000. To meet this target would require a tax rate of roughly $120 (in 1993 dollars) per ton of carbon content. *(Deficit reduction by 2001: $88.1 billion)*

47. *Extend the Gas Guzzler Tax.* Currently, passenger cars with fuel economy ratings of below 22.5 miles per gallon (MPG) are subject to a "gas guzzler" tax, which starts at $1,000 per vehicle and increases to $7,700 per vehicle for cars with ratings of under 12.5 MPG. Light trucks, including vans and RVs, are exempt. This option would get rid of corporate average fuel economy (CAFE) standards and extend the gas guzzler tax to light trucks. It would apply to all vehicles with ratings below 40.5 MPG and would start at $200 per vehicle — gradually increasing to the current rate of $7,700 for vehicles with ratings of under 12.5 MPG. *(Deficit reduction by 2001: $8.7 billion)*

Notes

1. See, for example: George N. Hatsopolous, Paul R. Krugman and Lawrence H. Summers, "US Competitiveness: Beyond the Trade Deficit," *Science*, July 15, 1988.
2. J. Bradford De Long and Lawrence H. Summers, "Equipment Investment and Economic Growth," *Quarterly Journal of Economics*, V. 106 (May 1991), pp. 445-502.
3. Laurence J. Kotlikoff, "Alternative Policies to Stimulate US Saving," paper prepared for Subcouncil meeting on September 15, 1992.
4. US Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1994-1998* (Washington, DC: US Government Printing Office, January 1993).
5. *Social Security Bulletin*, V. 55, No. 2 (Summer 1992), p. 38.
6. Congressional Budget Office, 1993.
7. *Changes in the Progressivity of the Federal Tax System: 1980 to 1990* (Washington, DC: KPMG Peat Marwick Policy Economics Group, April 1990).

List of Public Meetings
1992

June	1	Corporate Governance (Philadelphia)
	3	Manufacturing
	9	Critical Technologies
	10	Trade Policy
	11	Training
	30	Manufacturing
July	1	Capital Formation (New York)
	9	Education
	22	Critical Technologies
	30	Public Infrastructure
August	5	Corporate Governance (Minneapolis)
September	3	Critical Technologies
	15	Capital Formation (New York)
	21	Training
	24	Education
	24	Manufacturing
	24	Public Infrastructure
	25	Corporate Governance (San Francisco)
	25	Trade Policy
October	9	Manufacturing: Workshop on Defense Conversion (Los Angeles)
	14	Capital Formation (New York)
	15	Critical Technologies
	15	Manufacturing
	19	Education
	21	Training
	27	Trade Policy
	28	Public Infrastructure
November	5	Critical Technologies
December	21	Capital Formation

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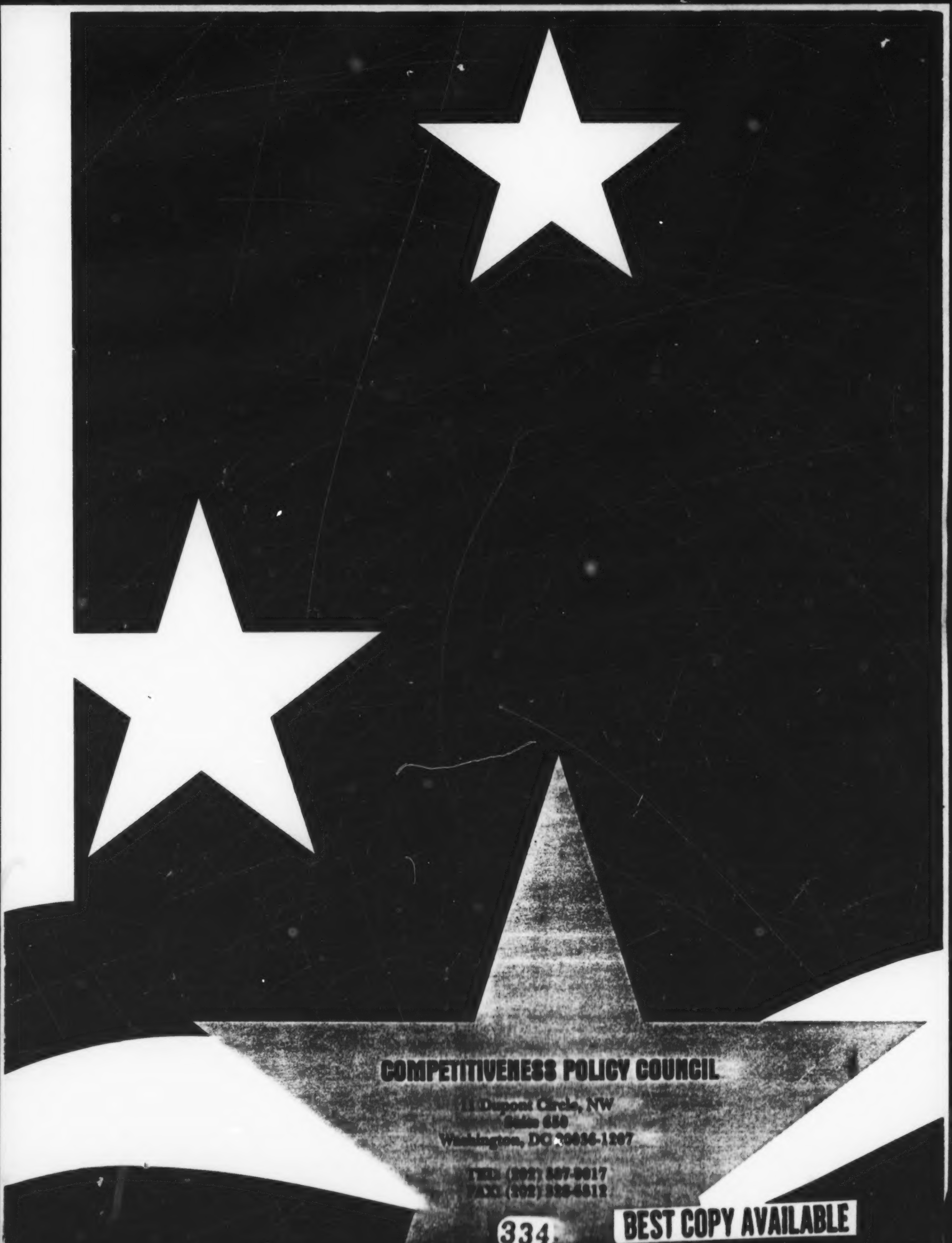
C. Fred Bergsten	Howard Rosen
Chairman	Executive Director



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